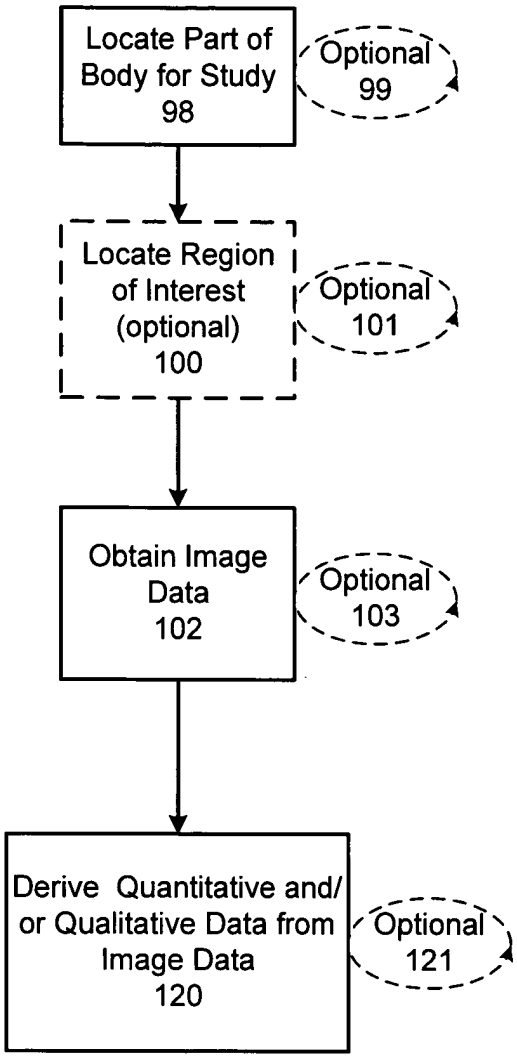

Locate Part of Body for Study 98
Optional 99
Locate Region of Interest (optional) 100
Optional 101
Obtain Image Data 102
Optional 103
Derive Quantitative and/or Qualitative Data from Image Data 120
Optional 121

FIG. 1A

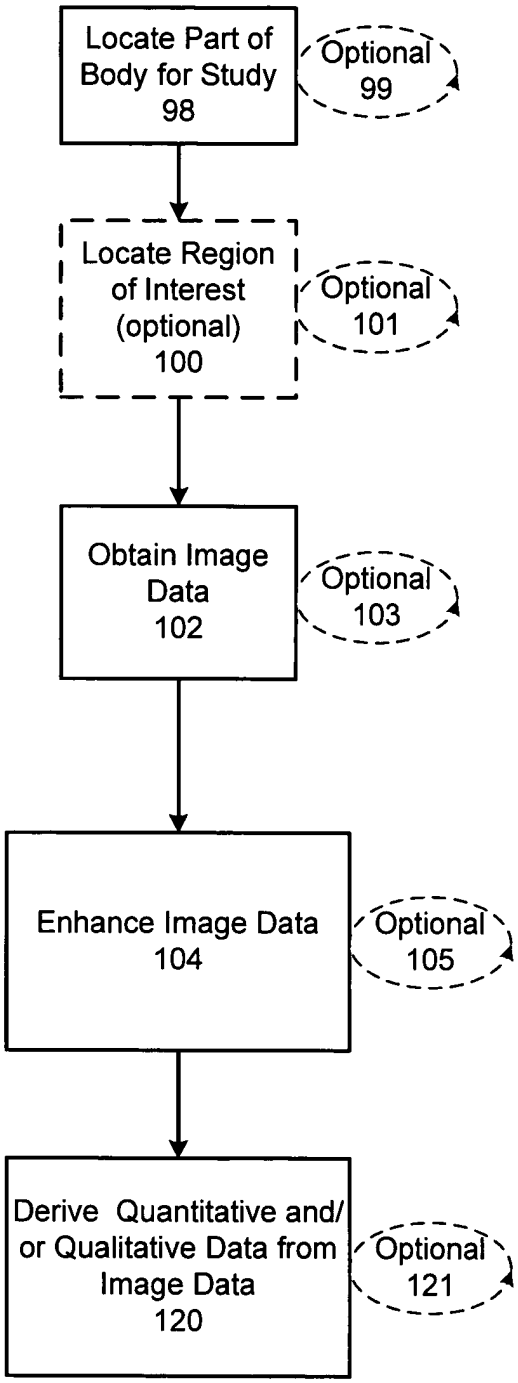

Locate Part of Body for Study 98
Optional 99
Locate Region of Interest (optional) 100
Optional 101
Obtain Image Data 102
Optional 103
Enhance Image Data 104
Optional 105
Derive Quantitative and/ or Qualitative Data from Image Data 120
Optional 121

FIG. 1B

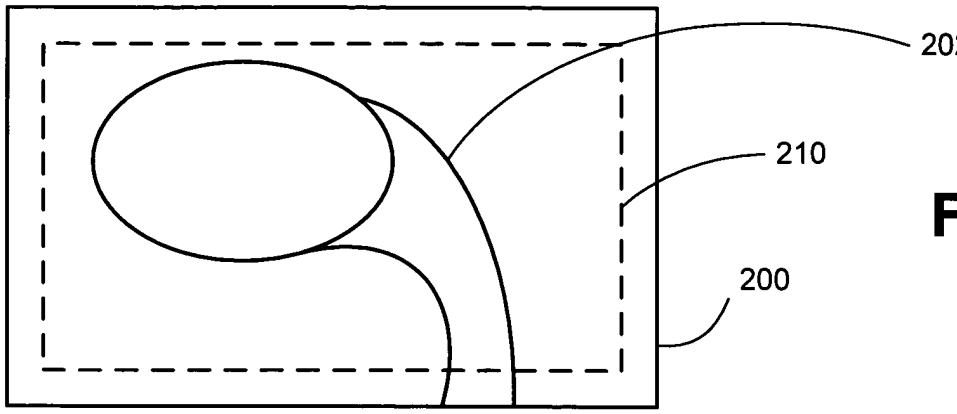


FIG. 2A

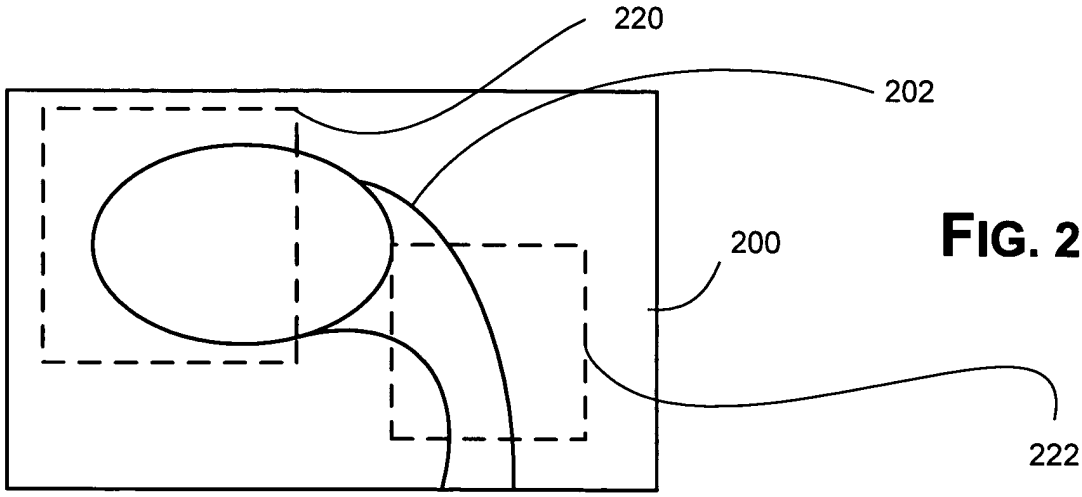


FIG. 2B

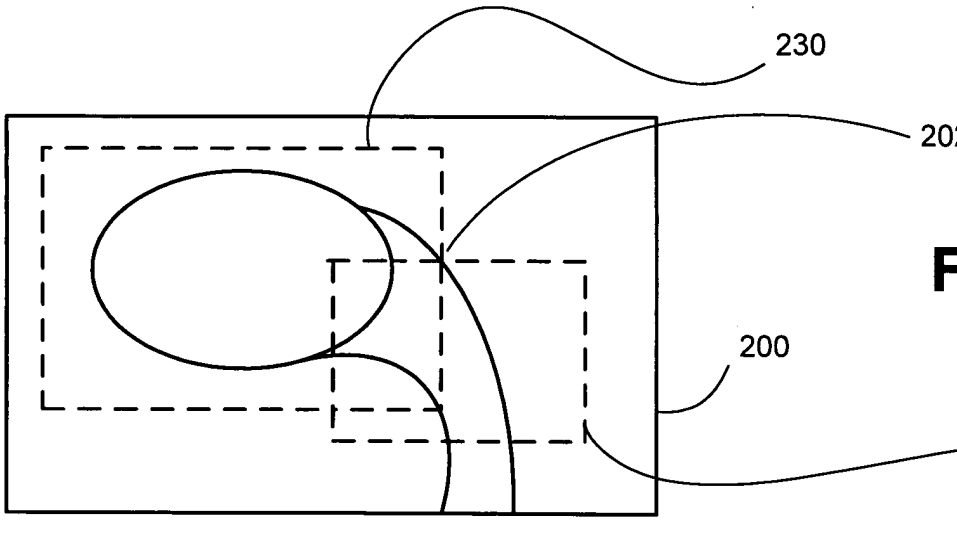


FIG. 2C

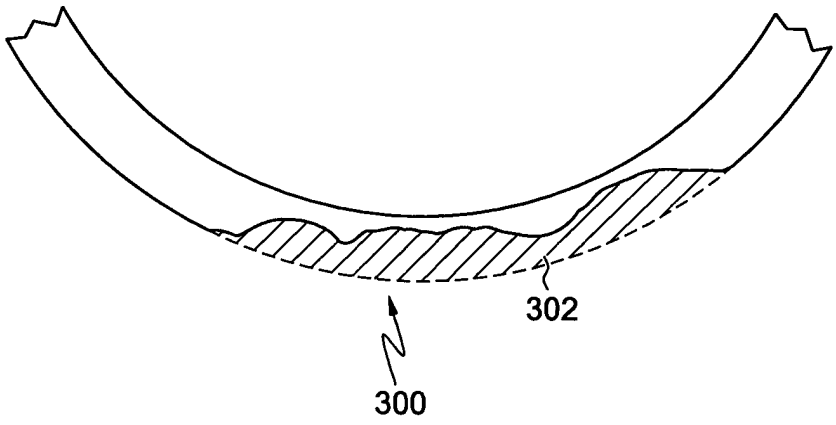


FIG. 3A

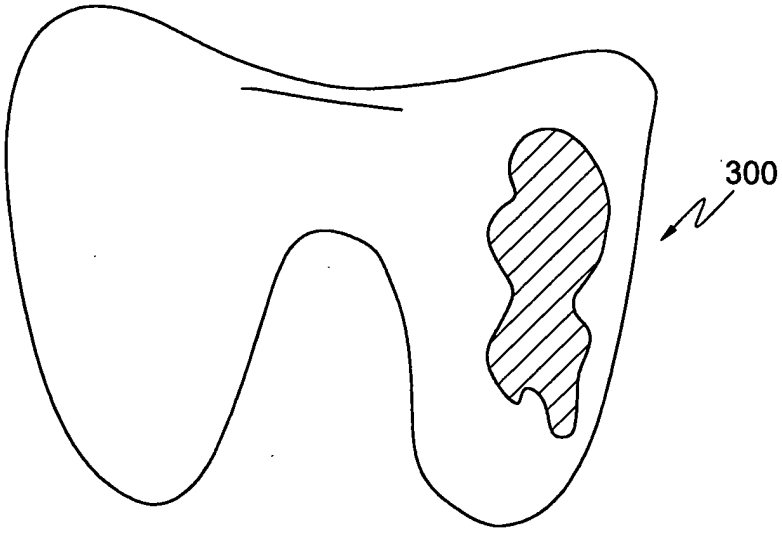


FIG. 3B

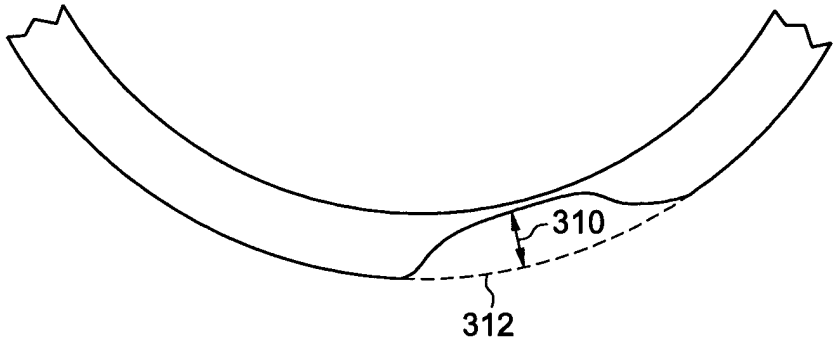


FIG. 3C

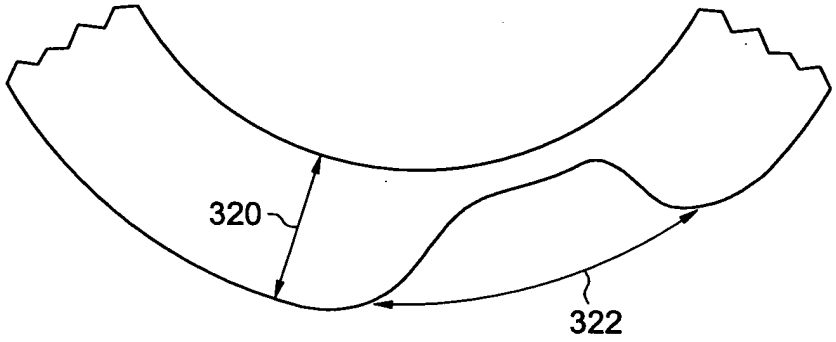


FIG. 3D

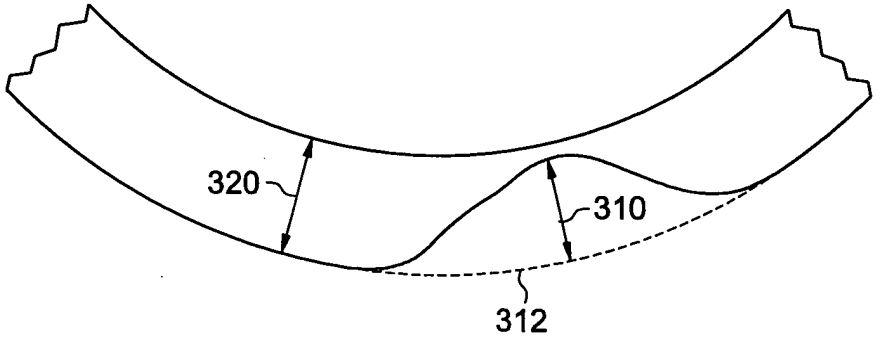


FIG. 3E

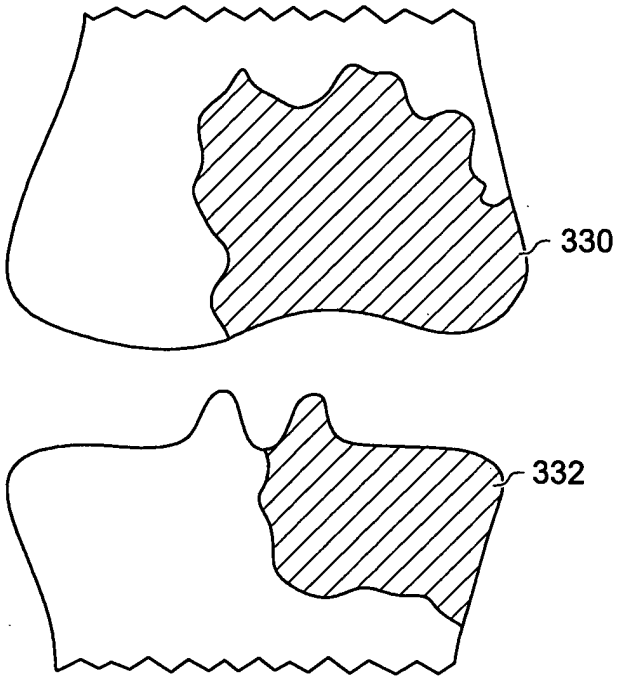


FIG. 3F

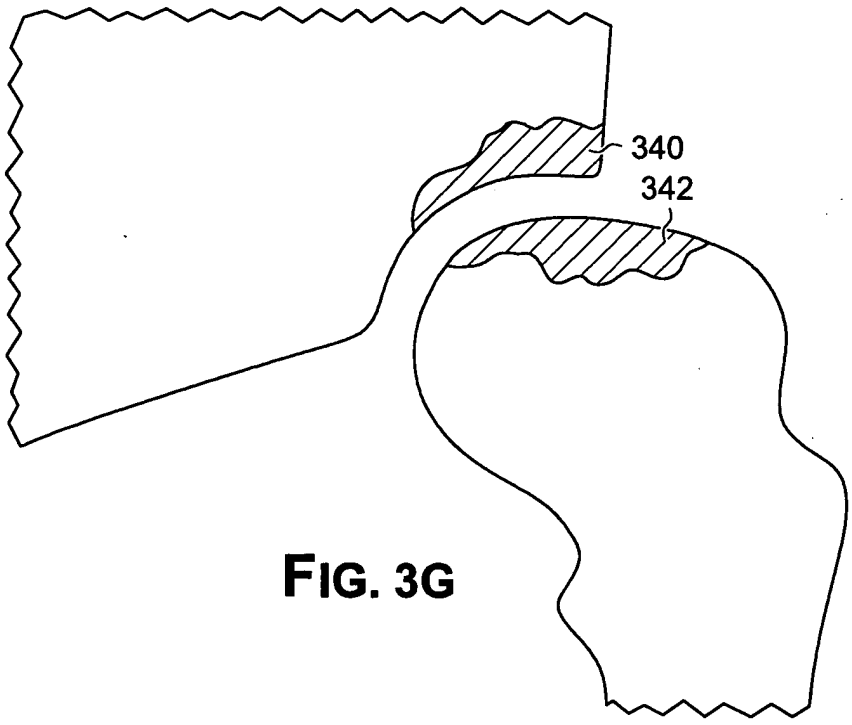


FIG. 3G

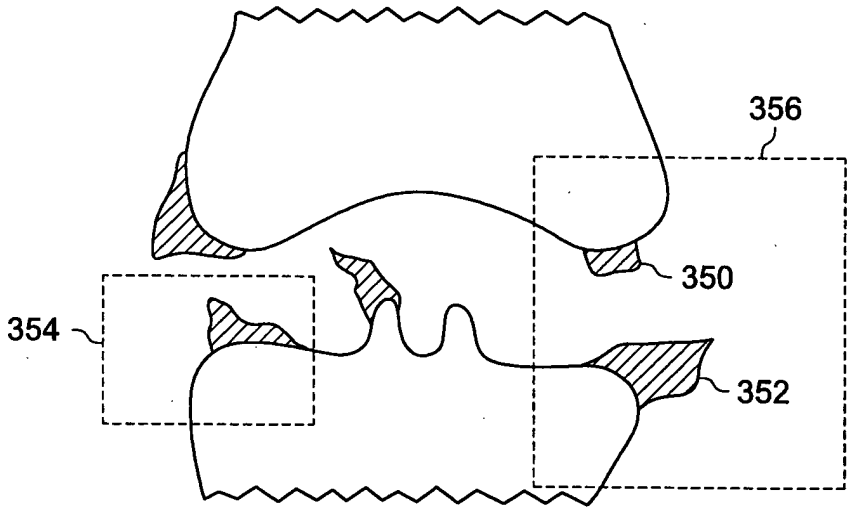


FIG. 3H

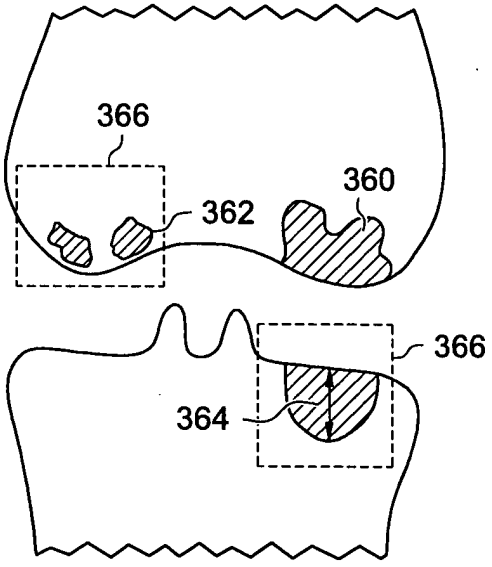


FIG. 3I

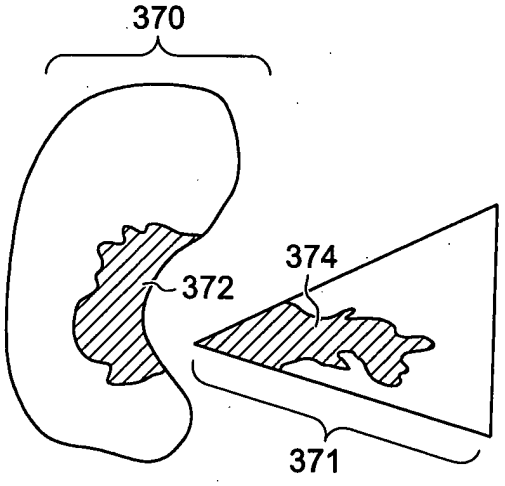


FIG. 3J

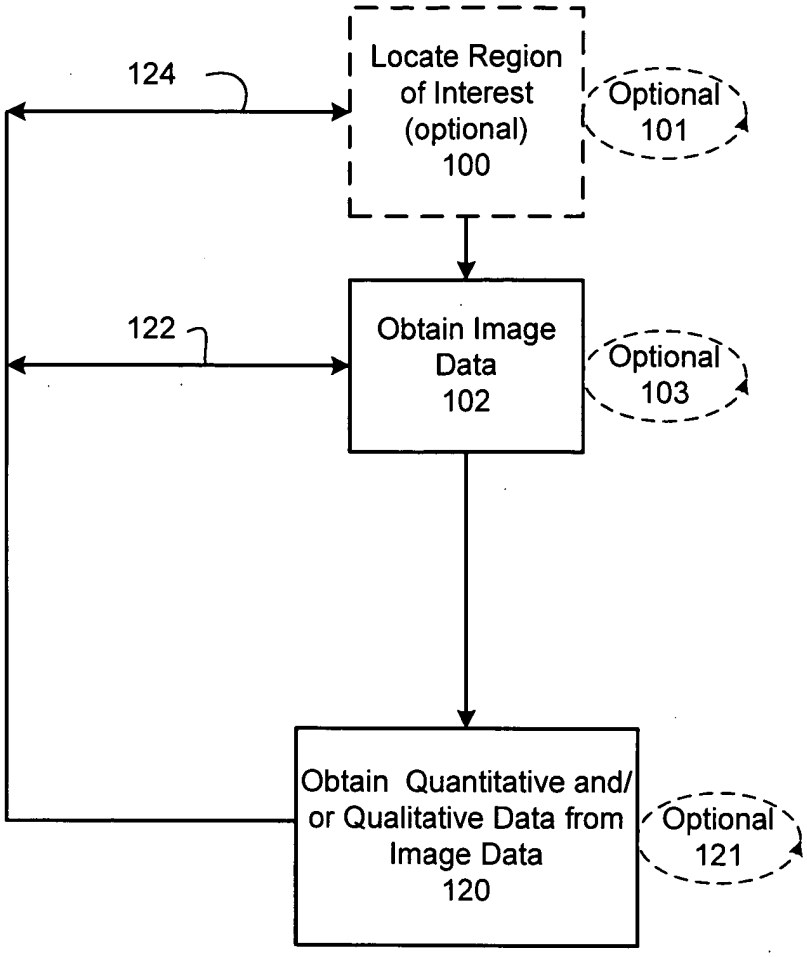

124
Locate Region of Interest (optional) 100
Optional 101
122
Obtain Image Data 102
Optional 103
Obtain Quantitative and/or Qualitative Data from Image Data 120
Optional 121

FIG. 4A

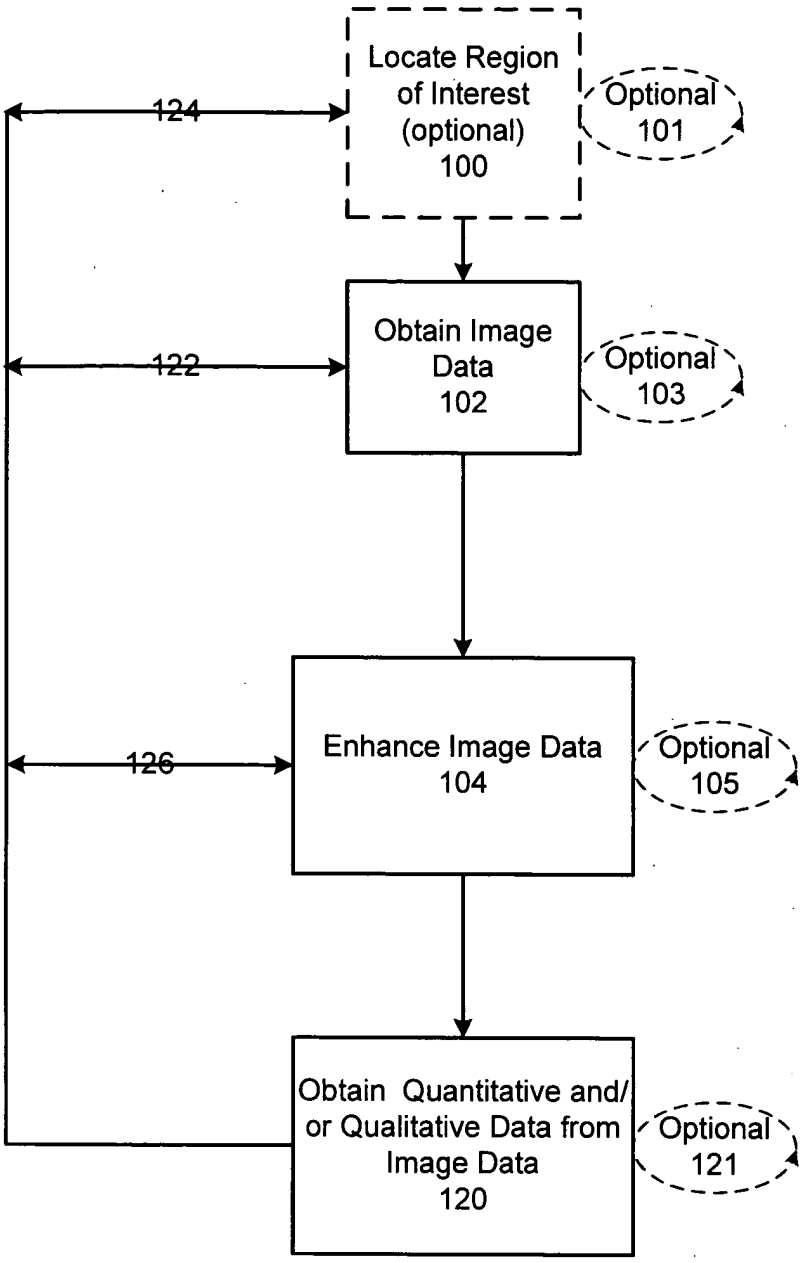

Locate Region of Interest (optional) 100
Optional 101
124
Obtain Image Data 102
Optional 103
122
Enhance Image Data 104
Optional 105
126
Obtain Quantitative and/or Qualitative Data from Image Data 120
Optional 121

FIG. 4B

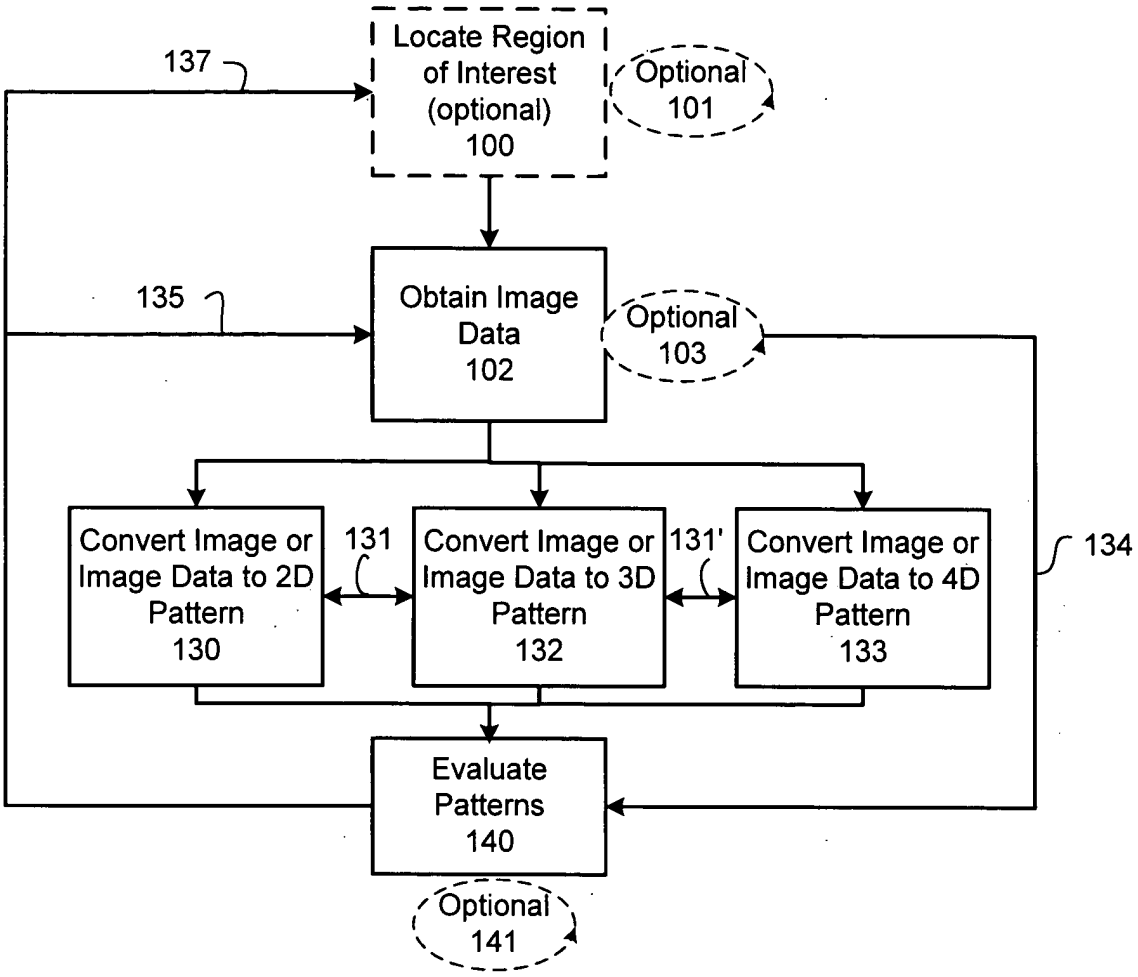

Locate Region of Interest (optional) 100
Optional 101
137
Obtain Image Data 102
Optional 103
135
Convert Image or Image Data to 2D Pattern 130
131
Convert Image or Image Data to 3D Pattern 132
131'
Convert Image or Image Data to 4D Pattern 133
134
Evaluate Patterns 140
Optional 141

FIG. 5A

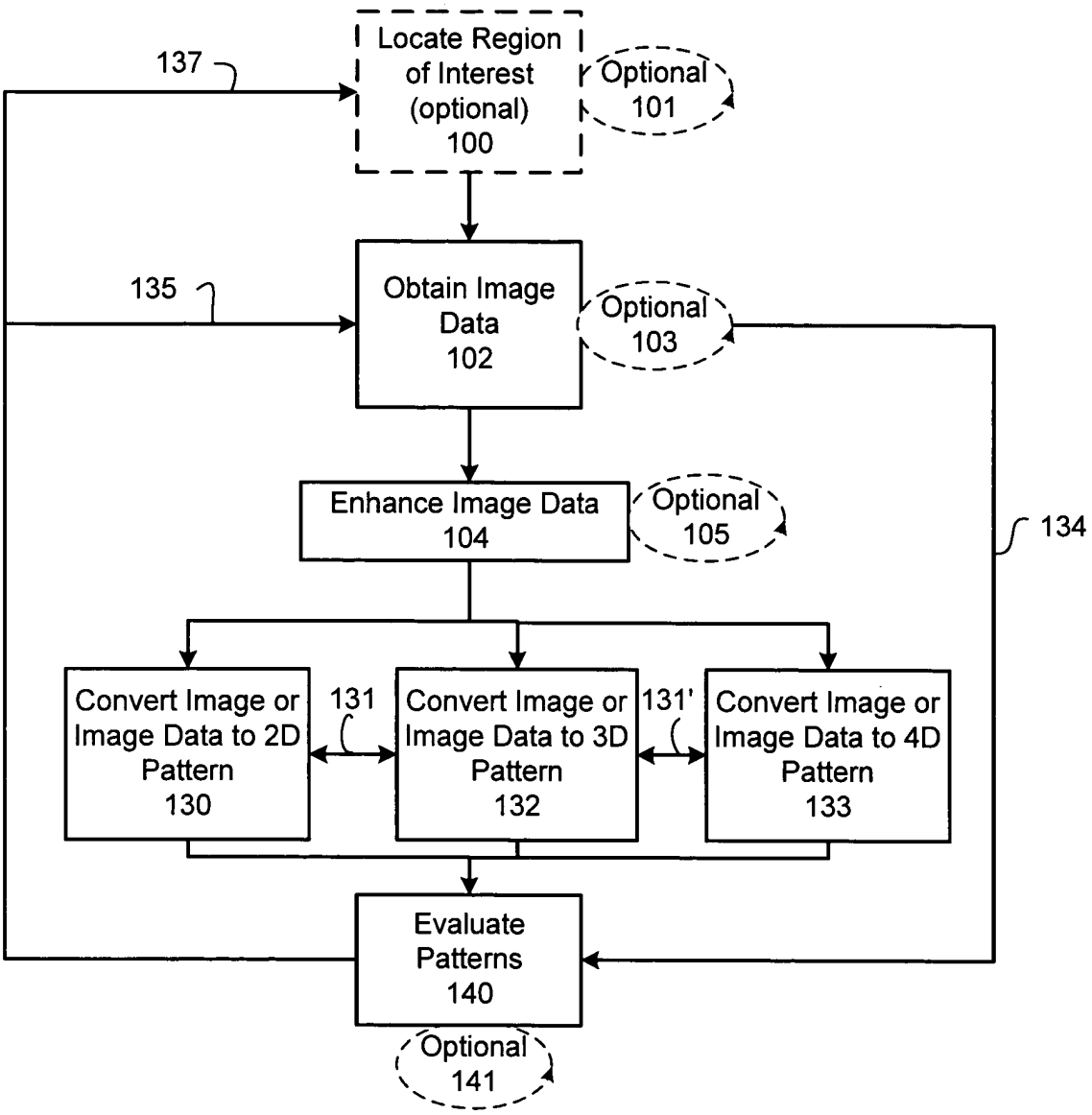

Locate Region of Interest (optional) 100
Optional 101
137
Obtain Image Data 102
Optional 103
135
Enhance Image Data 104
Optional 105
134
Convert Image or Image Data to 2D Pattern 130
131
Convert Image or Image Data to 3D Pattern 132
131'
Convert Image or Image Data to 4D Pattern 133
Evaluate Patterns 140
Optional 141

FIG. 5B

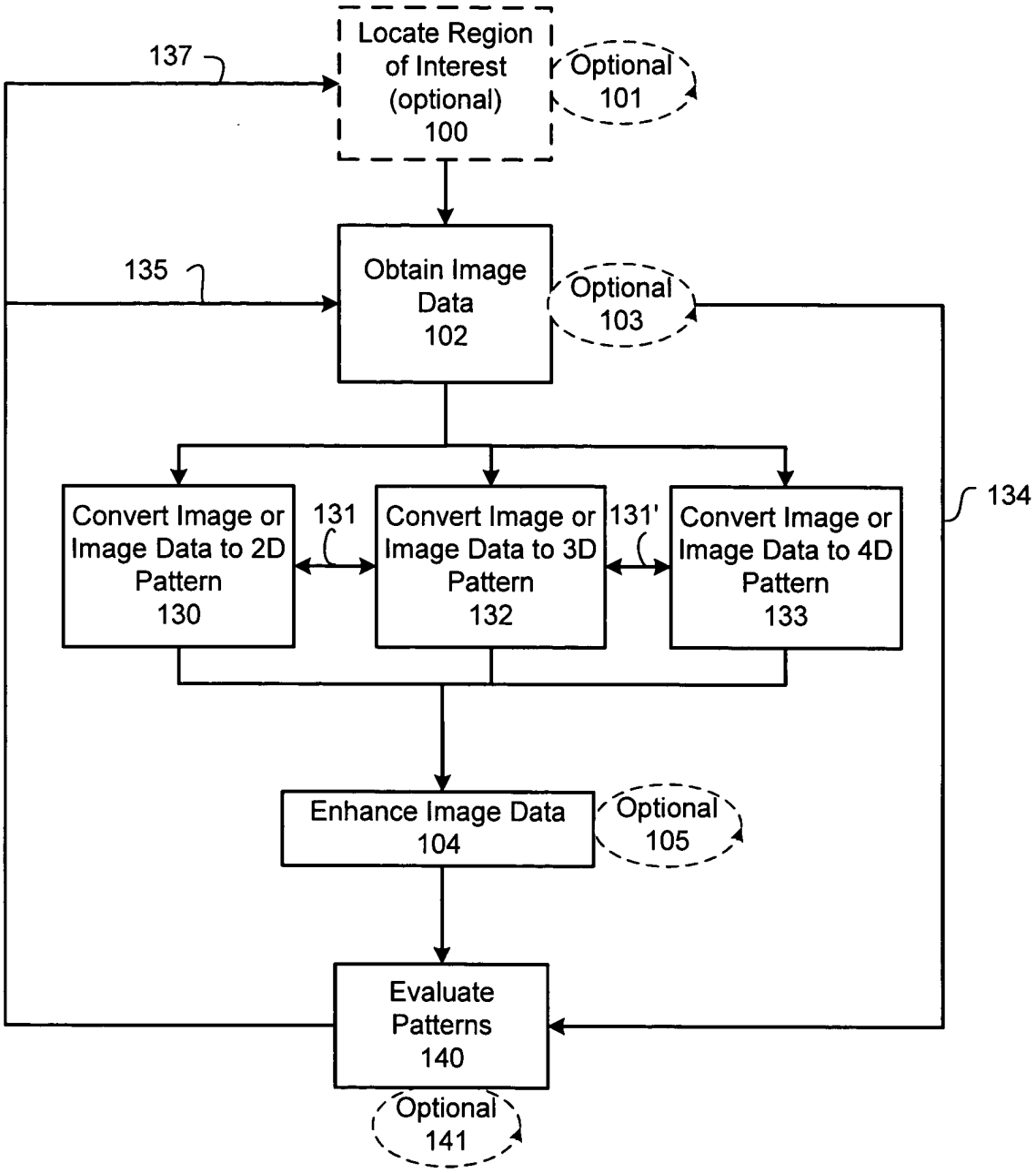

Locate Region of Interest (optional) 100
Optional 101
137
Obtain Image Data 102
Optional 103
135
Convert Image or Image Data to 2D Pattern 130
131
Convert Image or Image Data to 3D Pattern 132
131'
Convert Image or Image Data to 4D Pattern 133
134
Enhance Image Data 104
Optional 105
Evaluate Patterns 140
Optional 141

FIG. 5C

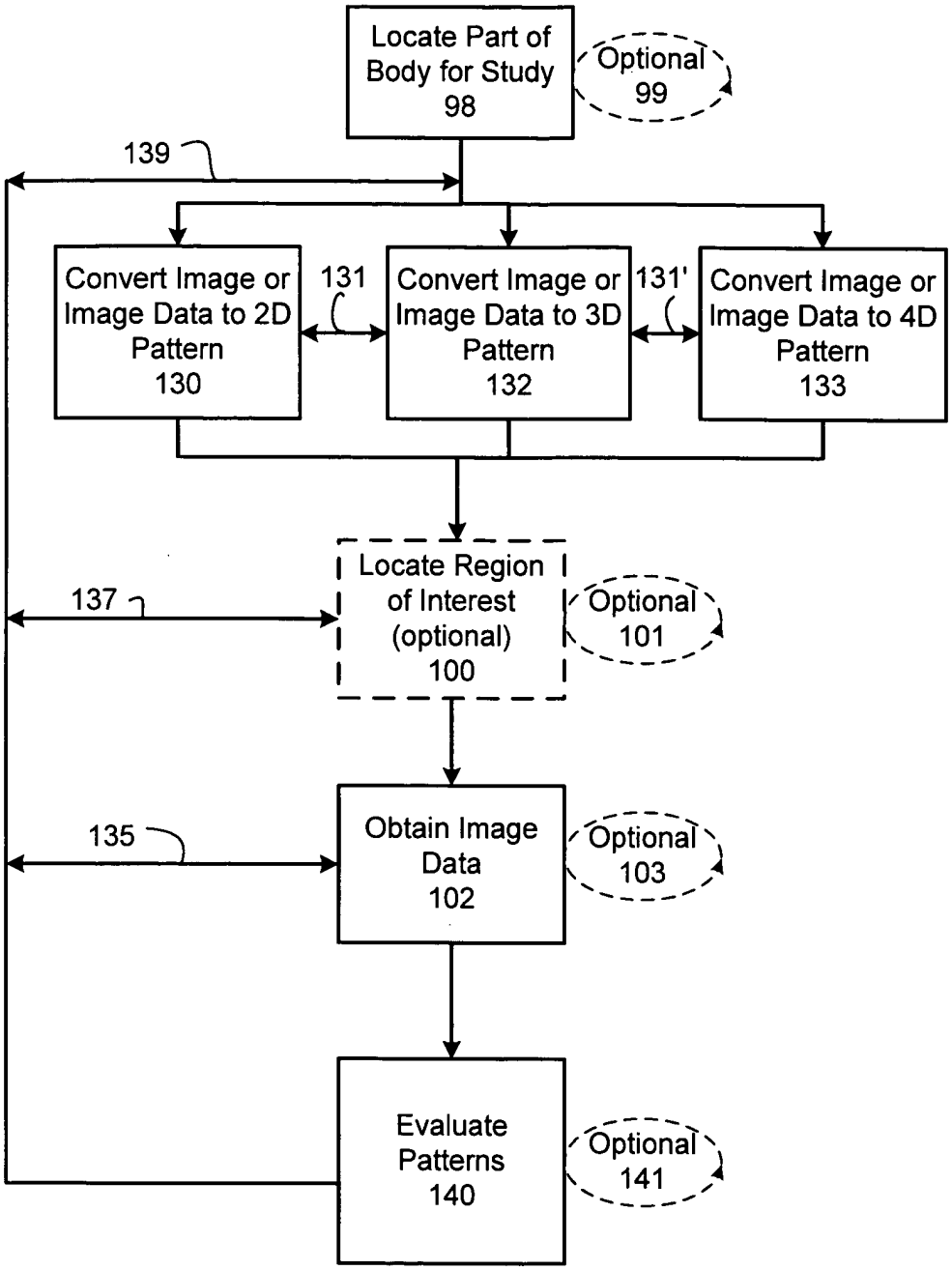

Locate Part of Body for Study 98
Optional 99
139
Convert Image or Image Data to 2D Pattern 130
131
Convert Image or Image Data to 3D Pattern 132
131'
Convert Image or Image Data to 4D Pattern 133
Locate Region of Interest (optional) 100
Optional 101
137
Obtain Image Data 102
Optional 103
135
Evaluate Patterns 140
Optional 141

FIG. 5D

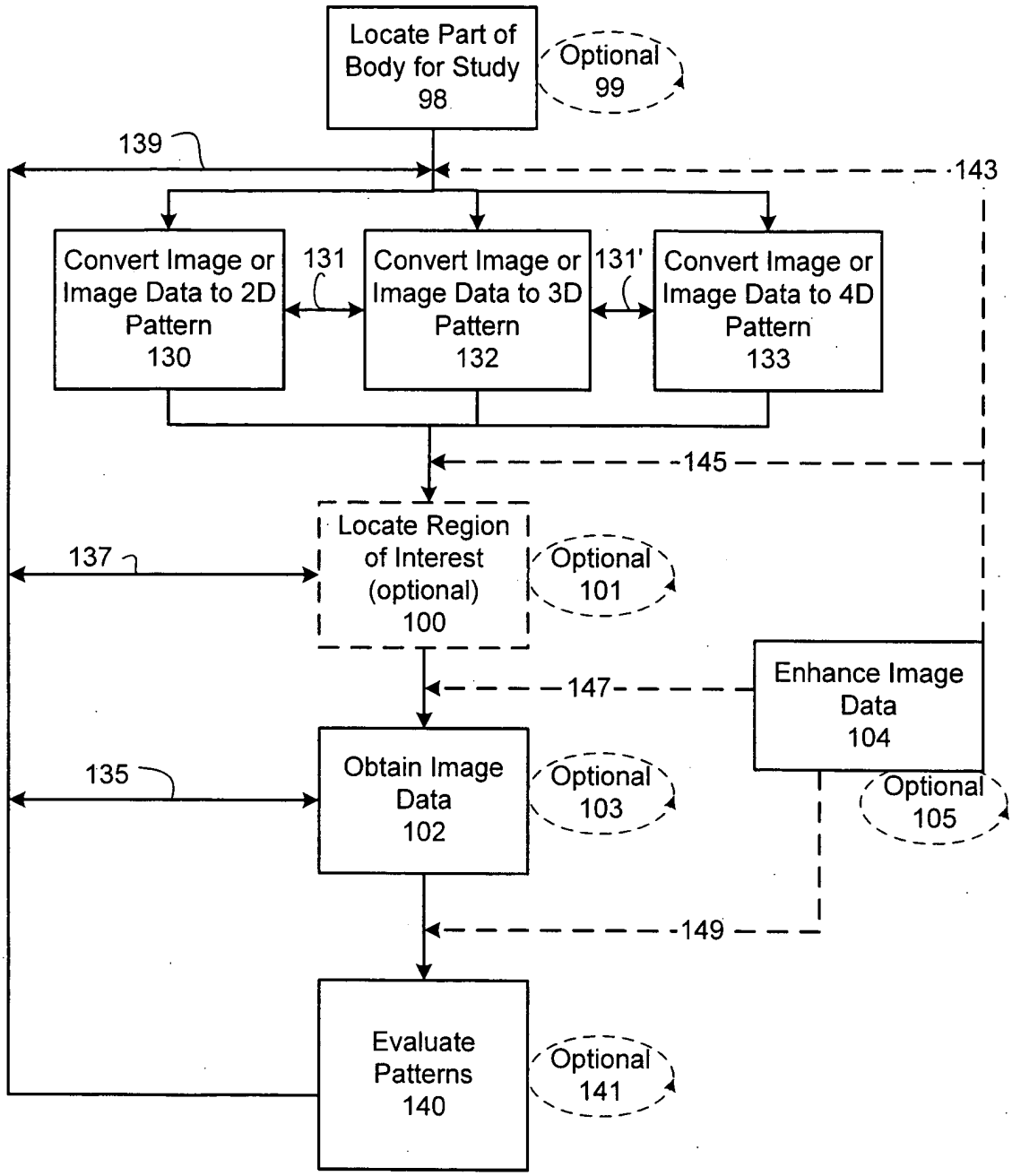

Locate Part of Body for Study 98
Optional 99
139
143
Convert Image or Image Data to 2D Pattern 130
131
Convert Image or Image Data to 3D Pattern 132
131'
Convert Image or Image Data to 4D Pattern 133
145
Locate Region of Interest (optional) 100
Optional 101
137
147
Enhance Image Data 104
Optional 105
Obtain Image Data 102
Optional 103
135
149
Evaluate Patterns 140
Optional 141

FIG. 5E

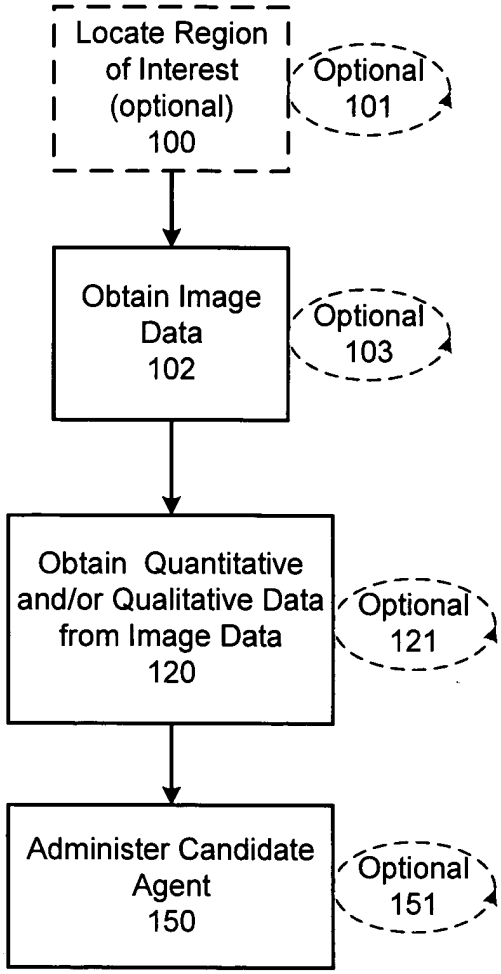

Locate Region of Interest (optional) 100
Optional 101
Obtain Image Data 102
Optional 103
Obtain Quantitative and/or Qualitative Data from Image Data 120
Optional 121
Administer Candidate Agent 150
Optional 151

FIG. 6A

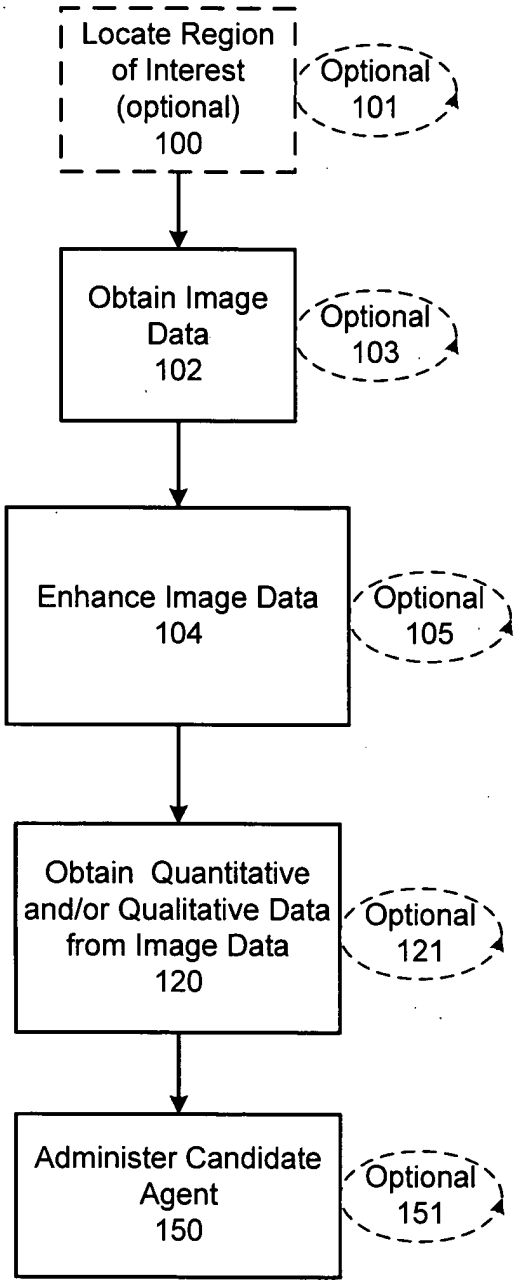

Locate Region of Interest (optional) 100
Optional 101
Obtain Image Data 102
Optional 103
Enhance Image Data 104
Optional 105
Obtain Quantitative and/or Qualitative Data from Image Data 120
Optional 121
Administer Candidate Agent 150
Optional 151

FIG. 6B

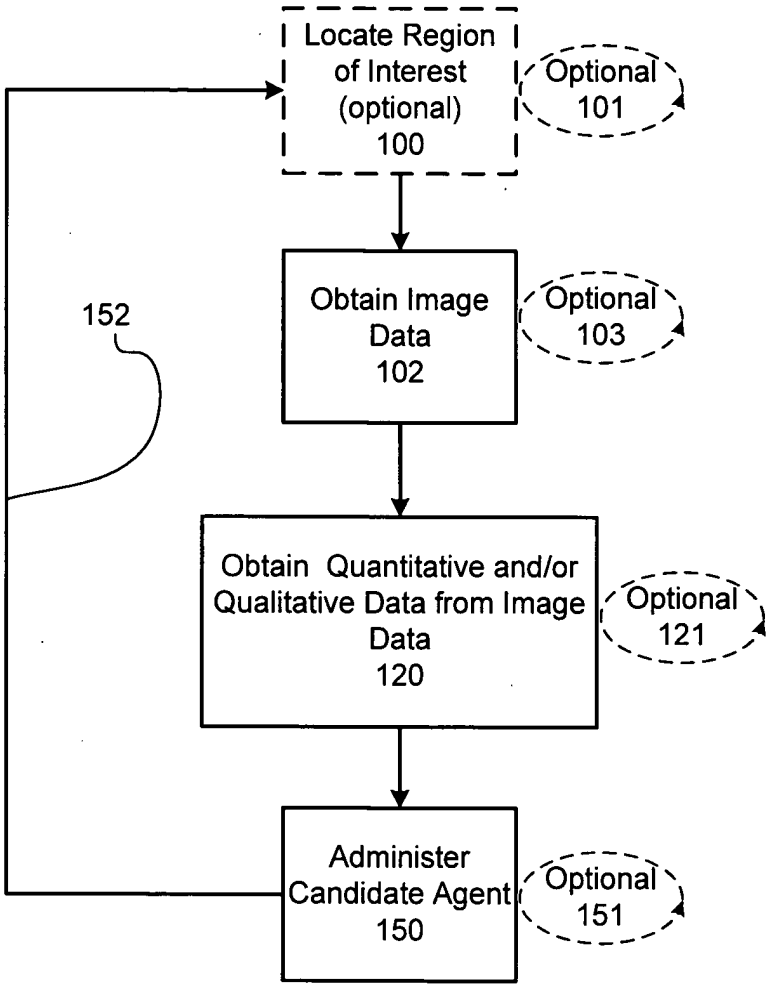

Locate Region of Interest (optional) 100
Optional 101
Obtain Image Data 102
Optional 103
152
Obtain Quantitative and/or Qualitative Data from Image Data 120
Optional 121
Administer Candidate Agent 150
Optional 151

FIG. 6C

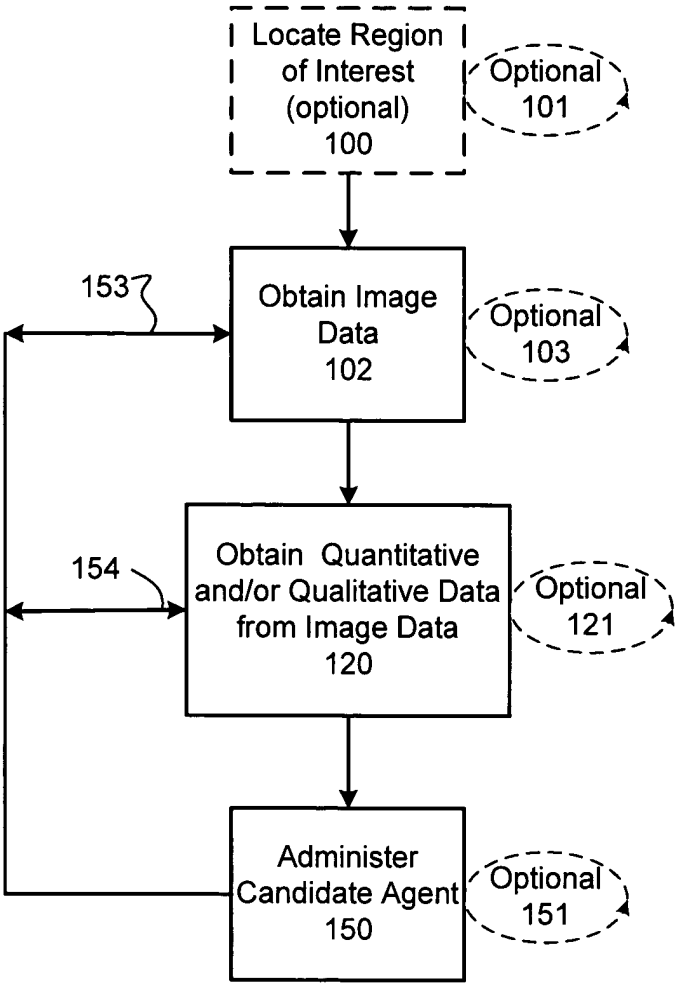

Locate Region of Interest (optional) 100
Optional 101
153
Obtain Image Data 102
Optional 103
154
Obtain Quantitative and/or Qualitative Data from Image Data 120
Optional 121
Administer Candidate Agent 150
Optional 151

FIG. 6D

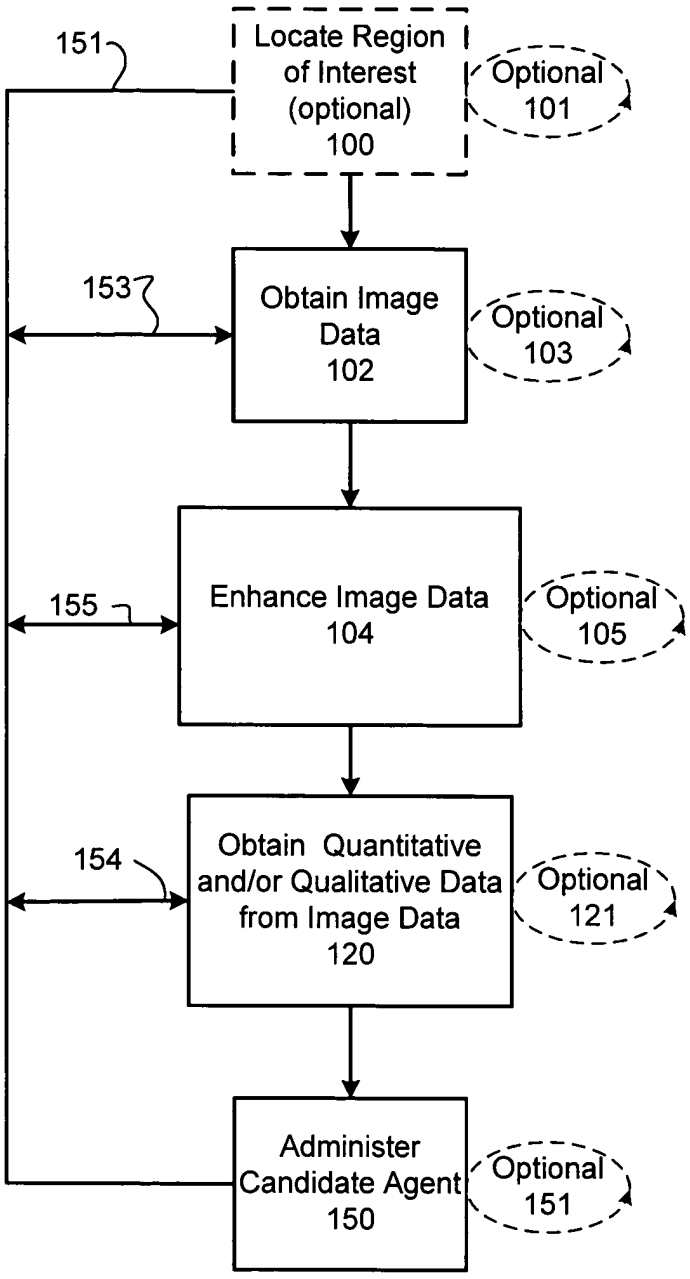

151
Locate Region of Interest (optional) 100
Optional 101
153
Obtain Image Data 102
Optional 103
155
Enhance Image Data 104
Optional 105
154
Obtain Quantitative and/or Qualitative Data from Image Data 120
Optional 121
Administer Candidate Agent 150
Optional 151

FIG. 6E

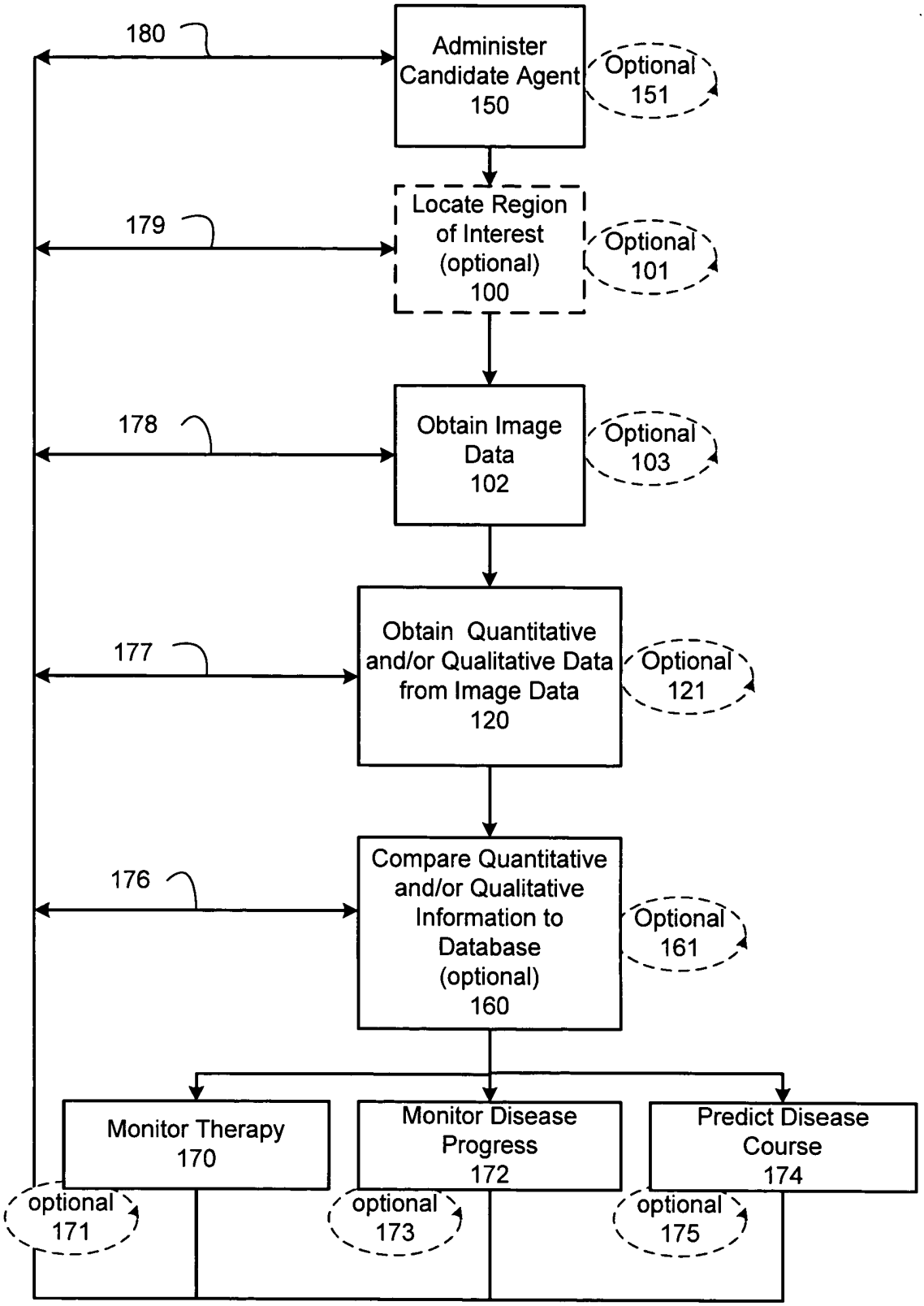

180
Administer Candidate Agent 150
Optional 151
179
Locate Region of Interest (optional) 100
Optional 101
178
Obtain Image Data 102
Optional 103
177
Obtain Quantitative and/or Qualitative Data from Image Data 120
Optional 121
176
Compare Quantitative and/or Qualitative Information to Database (optional) 160
Optional 161
Monitor Therapy 170
optional 171
Monitor Disease Progress 172
optional 173
Predict Disease Course 174
optional 175

FIG. 7A

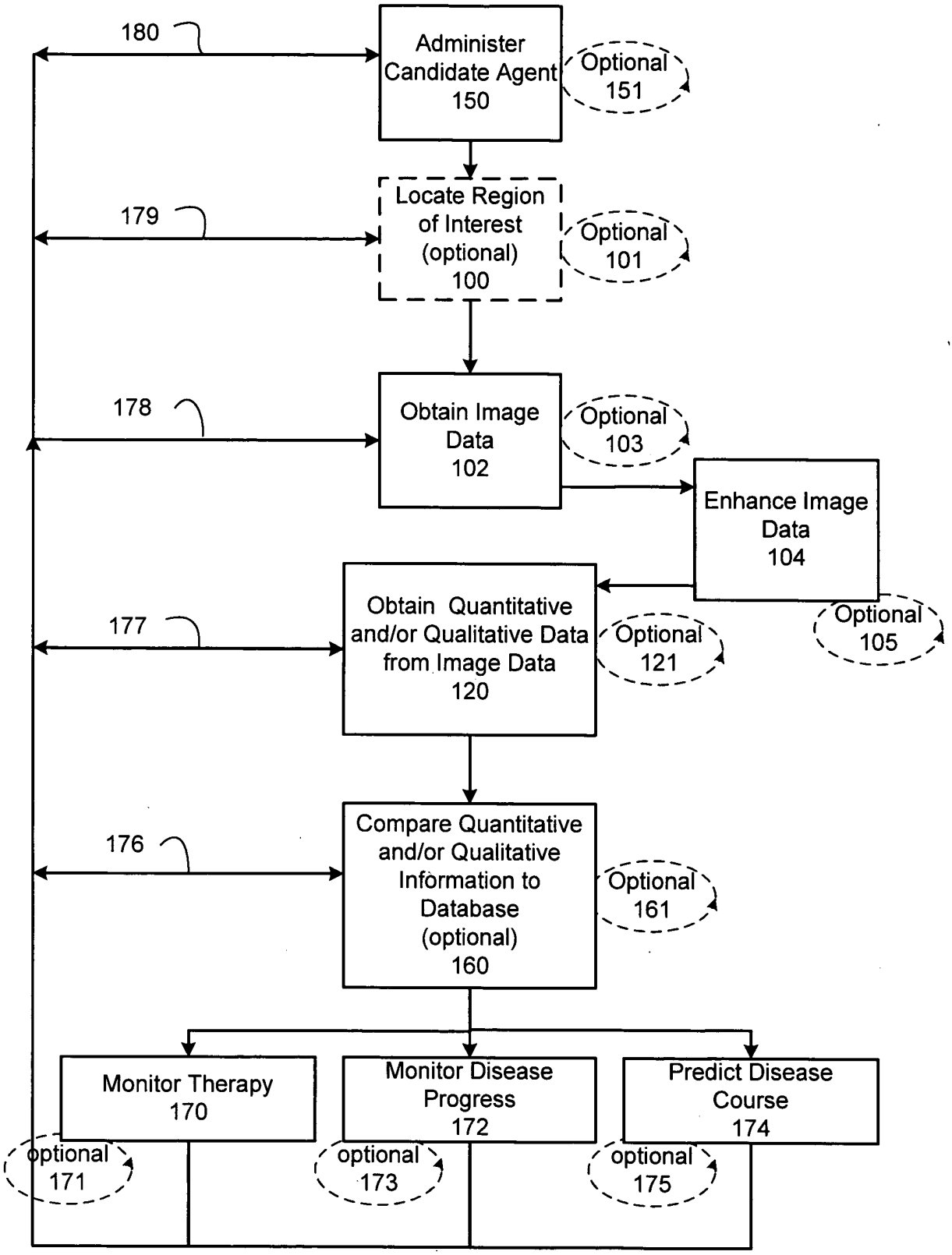

180
Administer Candidate Agent 150
Optional 151
Locate Region of Interest (optional) 100
179
Optional 101
178
Obtain Image Data 102
Optional 103
Enhance Image Data 104
Optional 105
177
Obtain Quantitative and/or Qualitative Data from Image Data 120
Optional 121
176
Compare Quantitative and/or Qualitative Information to Database (optional) 160
Optional 161
Monitor Therapy 170
Monitor Disease Progress 172
Predict Disease Course 174
optional 171
optional 173
optional 175

FIG. 7B

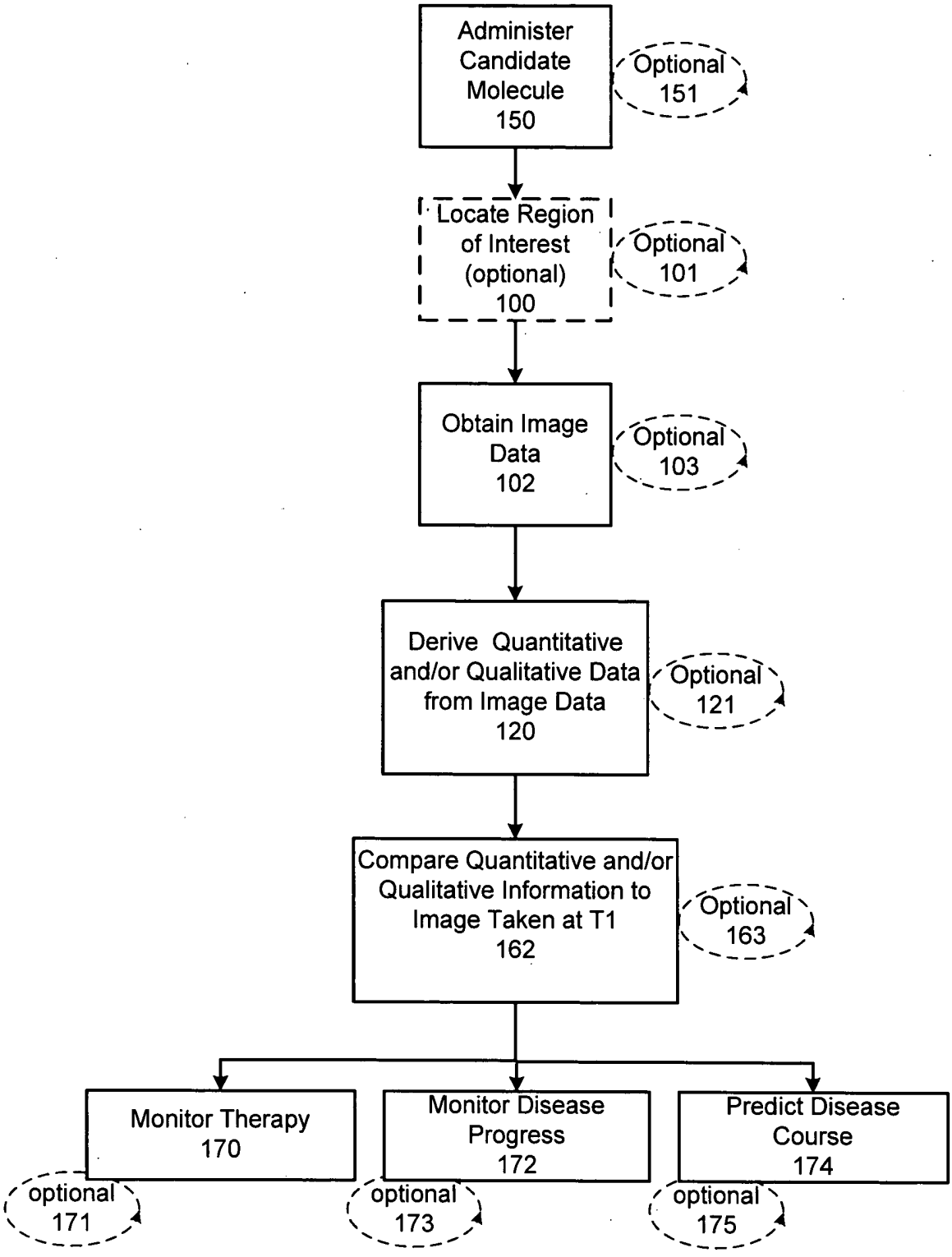

Administer Candidate Molecule 150
Optional 151
Locate Region of Interest (optional) 100
Optional 101
Obtain Image Data 102
Optional 103
Derive Quantitative and/or Qualitative Data from Image Data 120
Optional 121
Compare Quantitative and/or Qualitative Information to Image Taken at T1 162
Optional 163
Monitor Therapy 170
optional 171
Monitor Disease Progress 172
optional 173
Predict Disease Course 174
optional 175

FIG. 7C

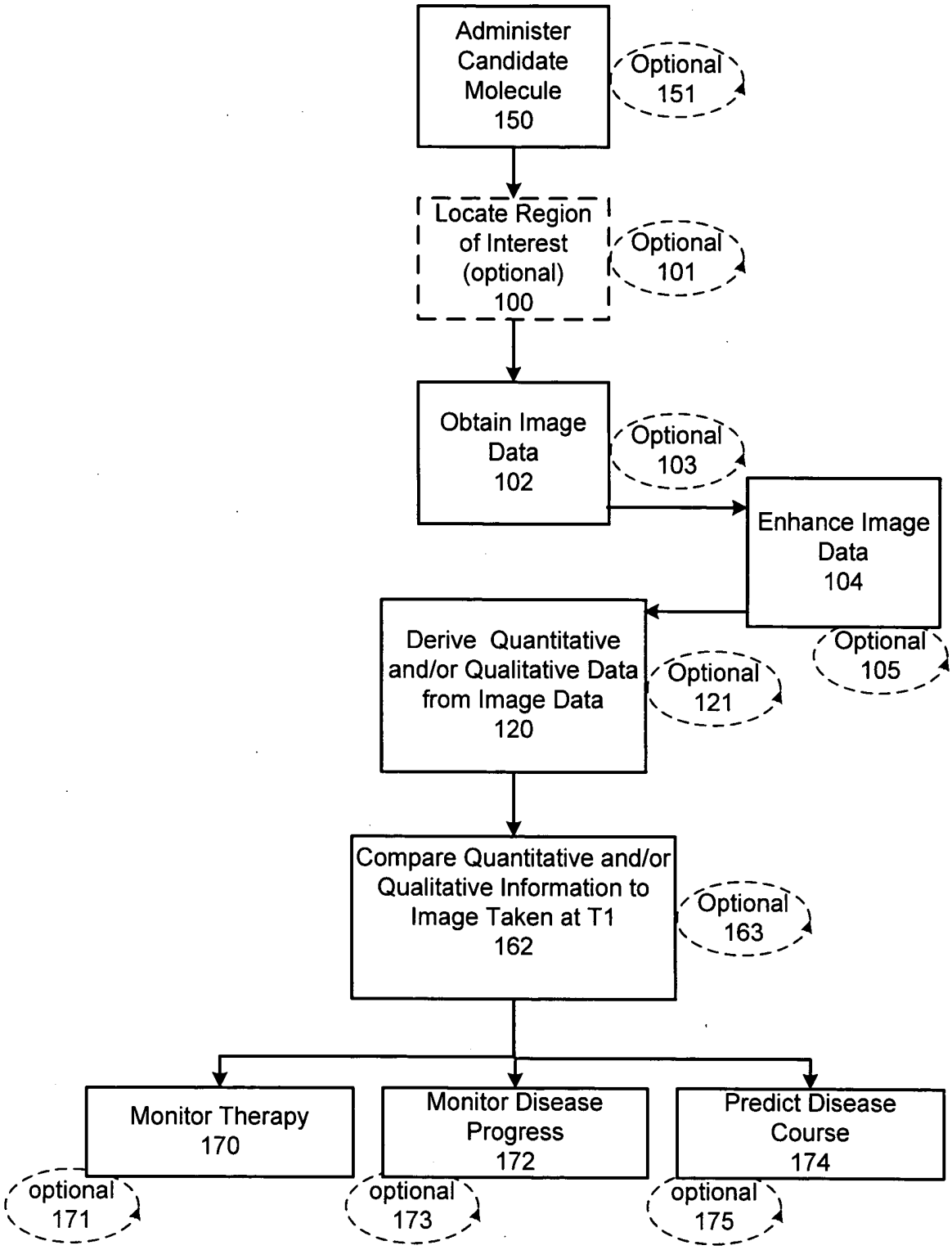

Administer Candidate Molecule 150
Optional 151
Locate Region of Interest (optional) 100
Optional 101
Obtain Image Data 102
Optional 103
Enhance Image Data 104
Optional 105
Derive Quantitative and/or Qualitative Data from Image Data 120
Optional 121
Compare Quantitative and/or Qualitative Information to Image Taken at T1 162
Optional 163
Monitor Therapy 170
optional 171
Monitor Disease Progress 172
optional 173
Predict Disease Course 174
optional 175

FIG. 7D

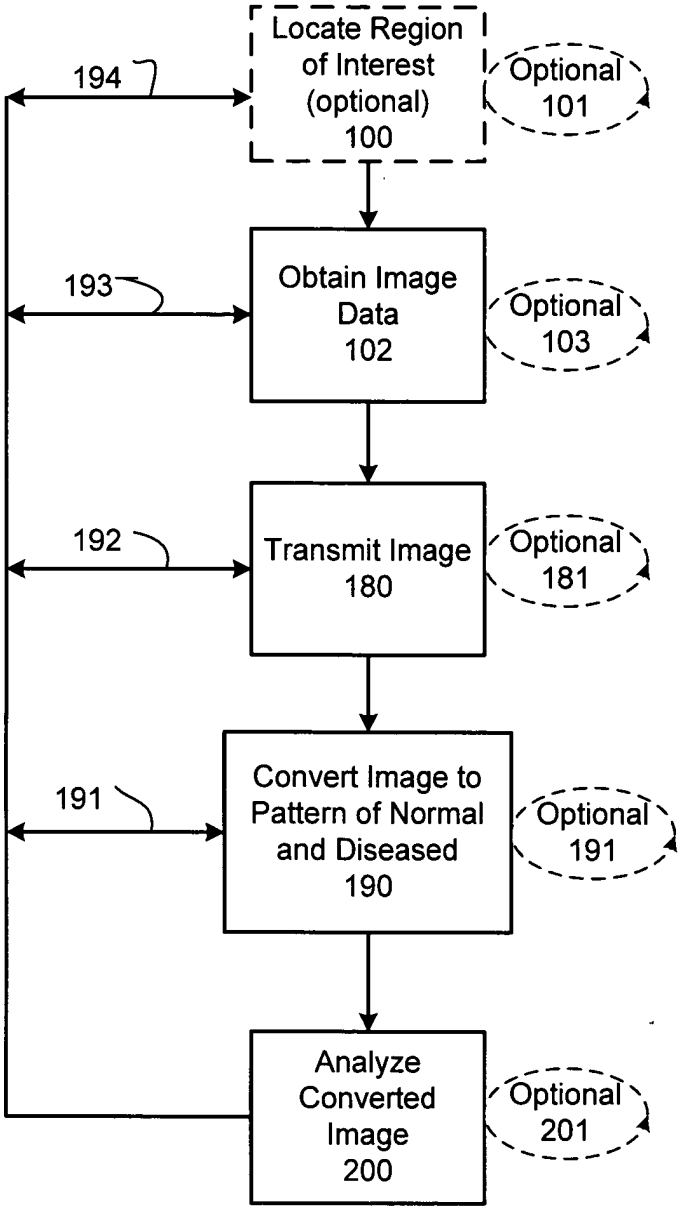

Locate Region of Interest (optional) 100
Optional 101
194
Obtain Image Data 102
Optional 103
193
Transmit Image 180
Optional 181
192
Convert Image to Pattern of Normal and Diseased 190
Optional 191
191
Analyze Converted Image 200
Optional 201

FIG. 8A

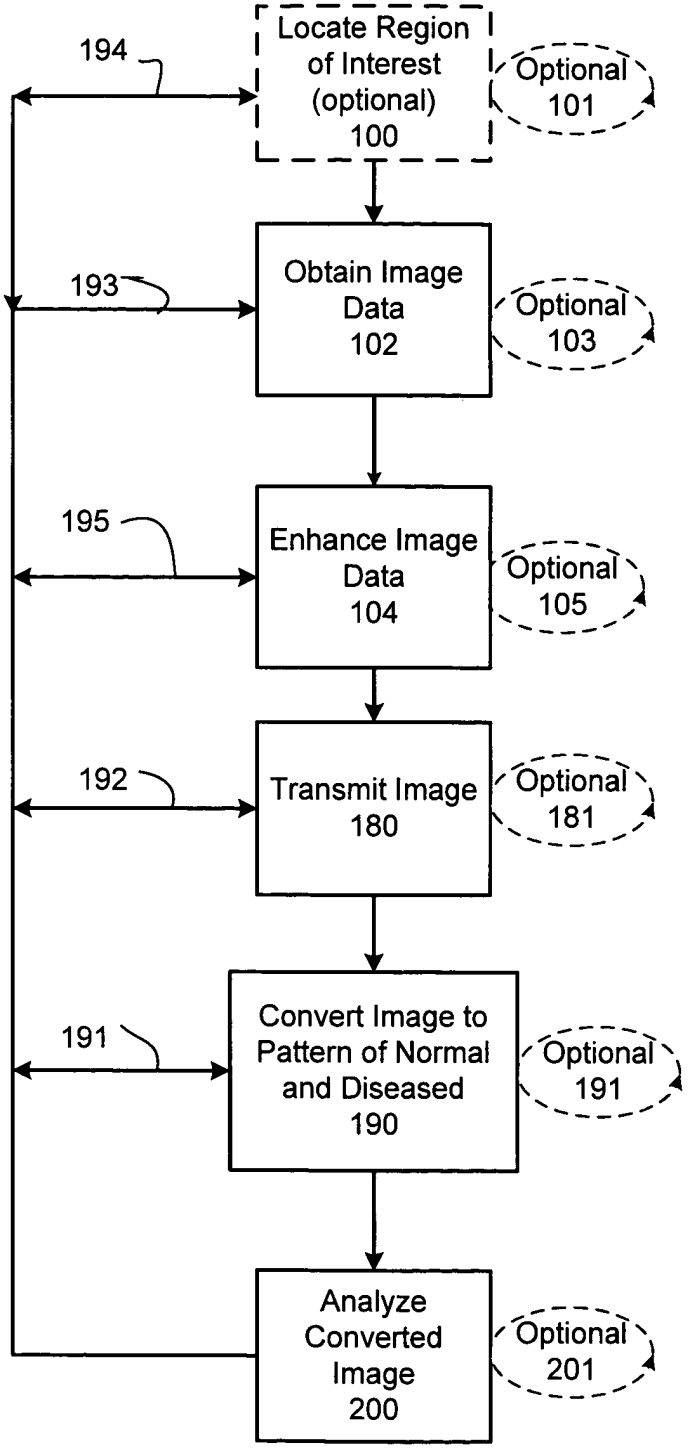

Locate Region of Interest (optional) 100
Optional 101
194
Obtain Image Data 102
Optional 103
193
Enhance Image Data 104
Optional 105
195
Transmit Image 180
Optional 181
192
Convert Image to Pattern of Normal and Diseased 190
Optional 191
191
Analyze Converted Image 200
Optional 201

FIG. 8B

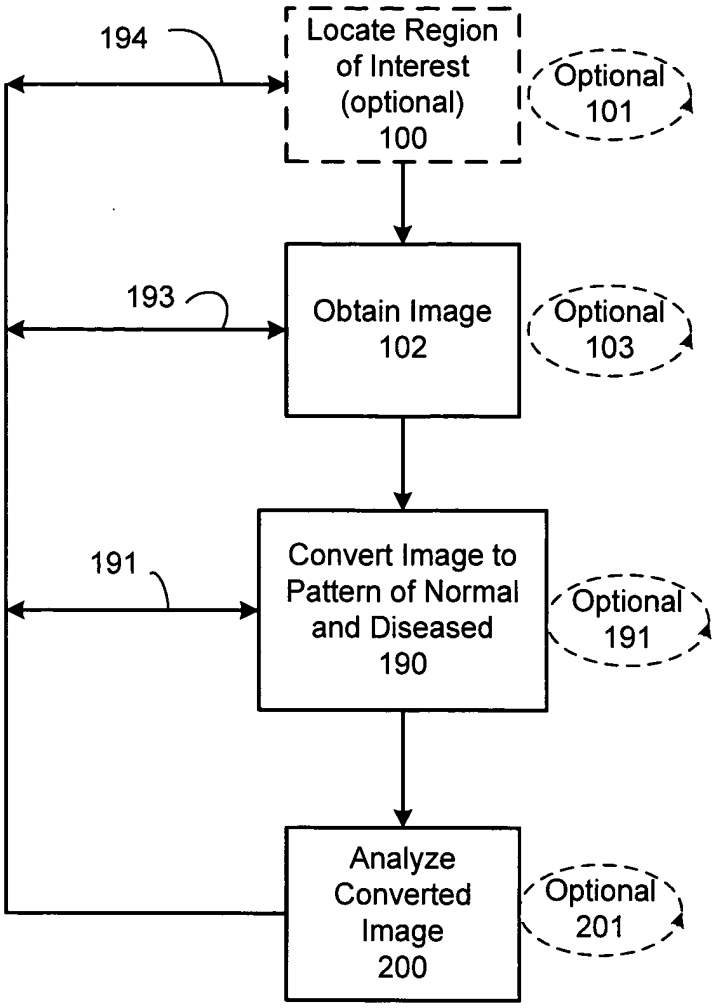

194
Locate Region of Interest (optional) 100
Optional 101
193
Obtain Image 102
Optional 103
191
Convert Image to Pattern of Normal and Diseased 190
Optional 191
Analyze Converted Image 200
Optional 201

FIG. 8C

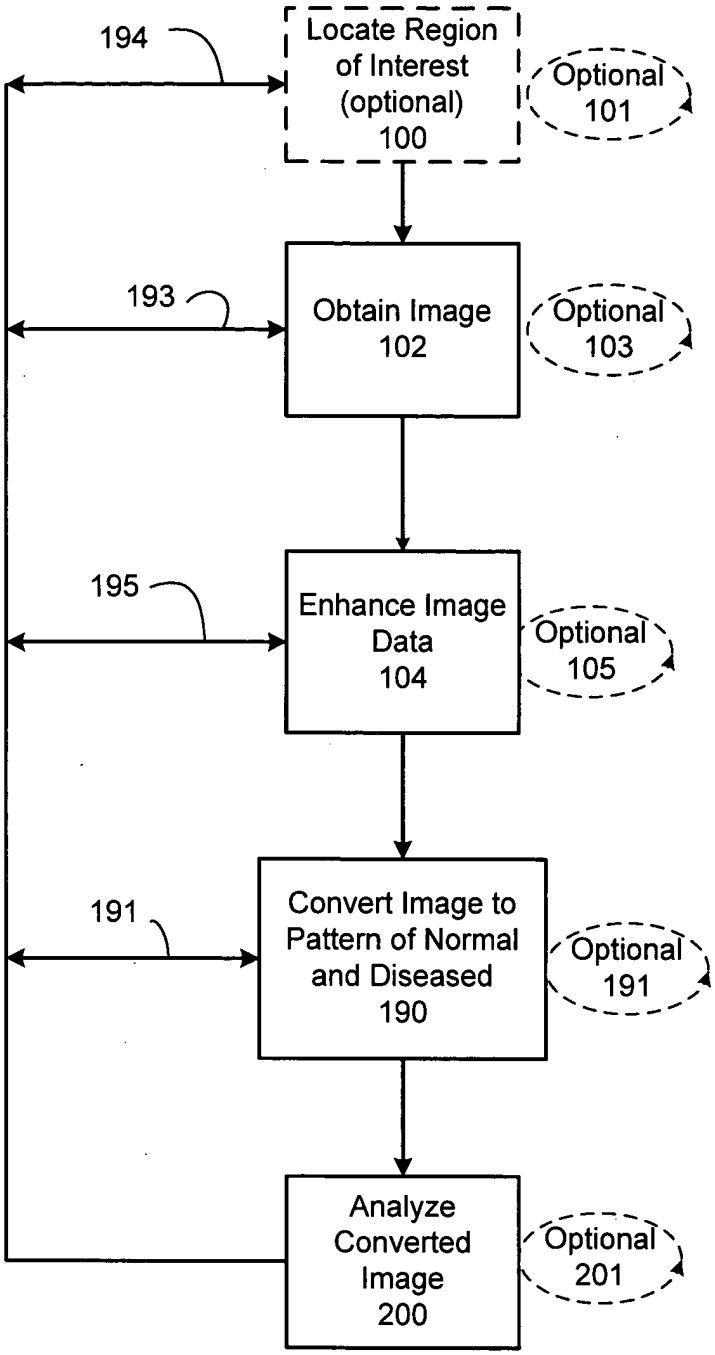

194
Locate Region of Interest (optional) 100
Optional 101
193
Obtain Image 102
Optional 103
195
Enhance Image Data 104
Optional 105
191
Convert Image to Pattern of Normal and Diseased 190
Optional 191
Analyze Converted Image 200
Optional 201

FIG. 8D

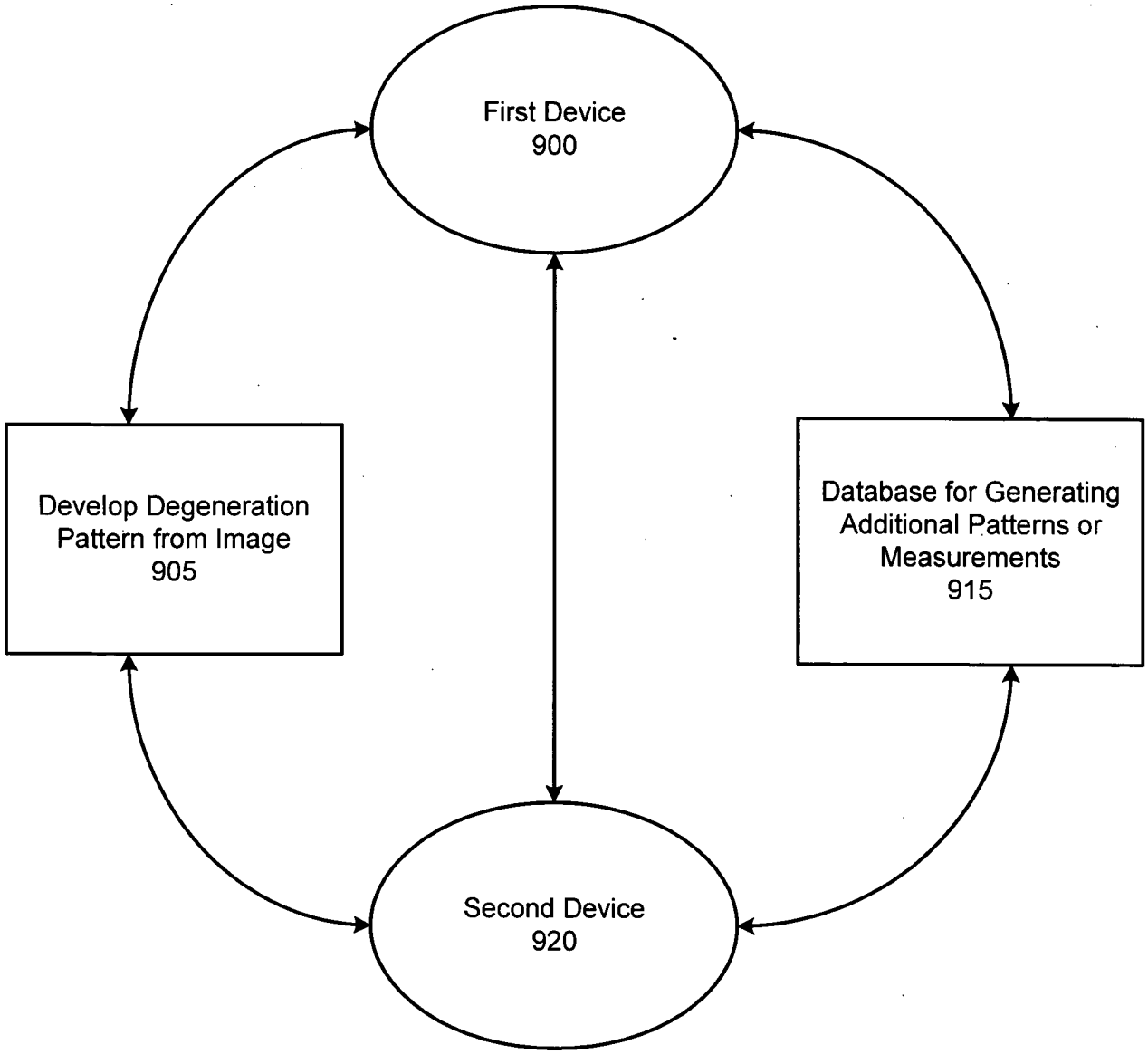

First Device
900
Develop Degeneration Pattern from Image
905
Database for Generating Additional Patterns or Measurements
915
Second Device
920

FIG. 9

Figure 10: Regions of Interest (ROI) Analyzed

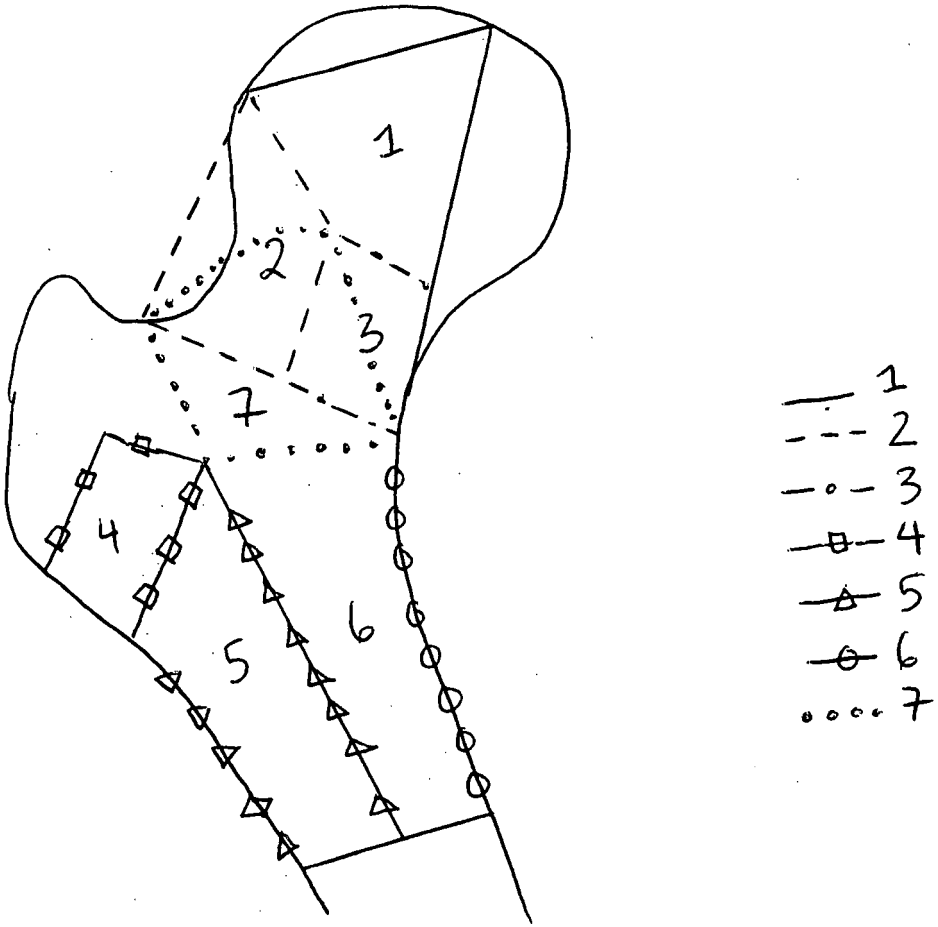


Figure 11: Biomechanical Testing of Intact Femur with Instron Instrument

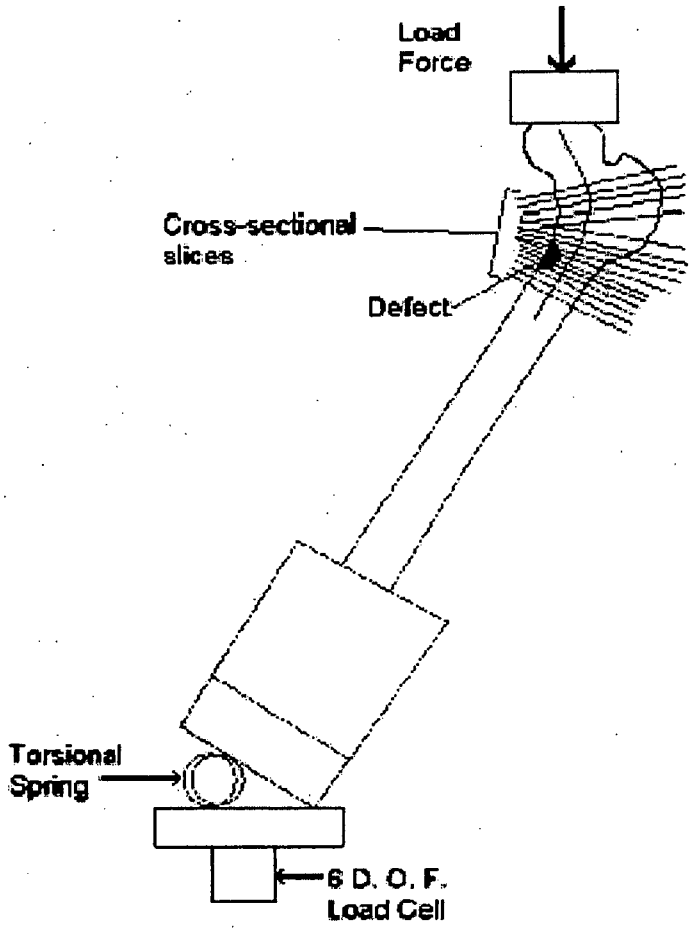
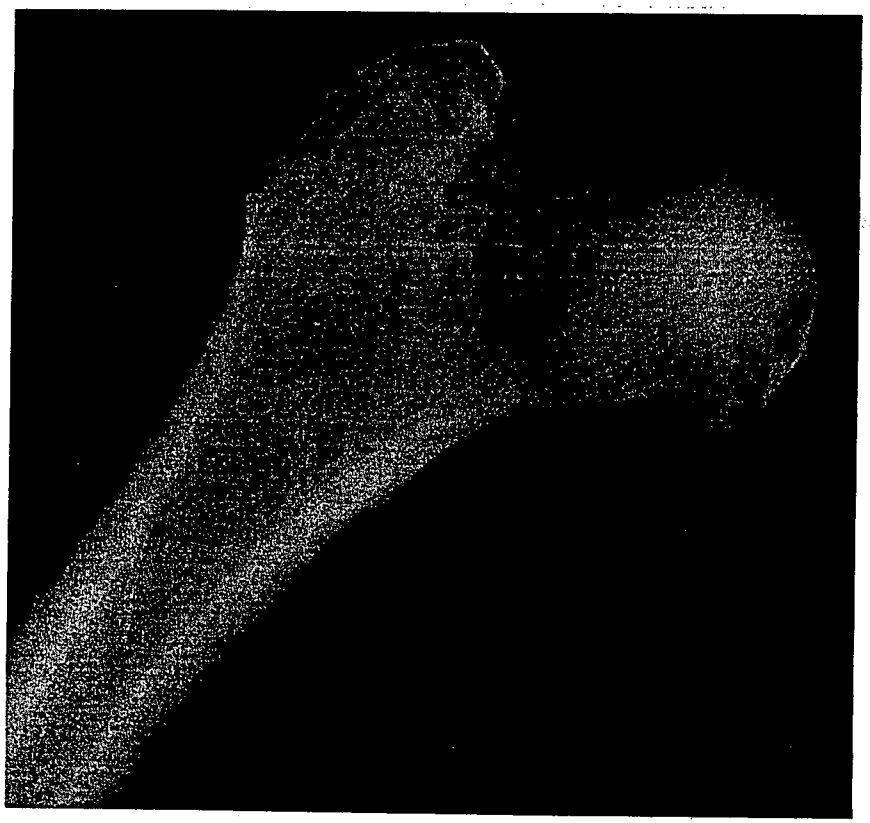
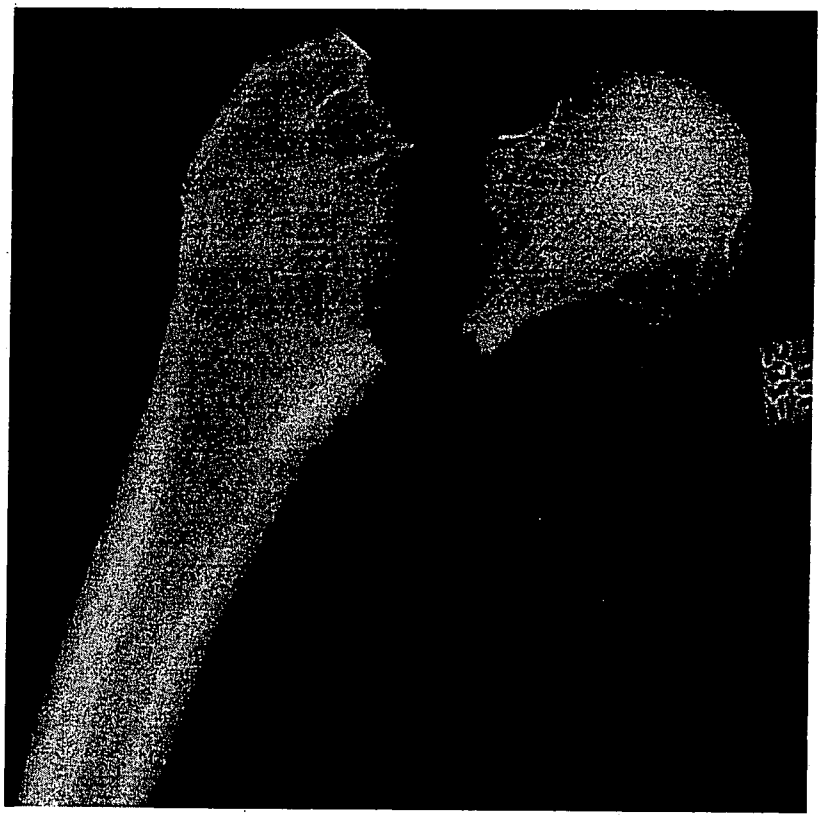


Figure 12: Example of Induced Fracture in Fresh Cadaveric Femur

A

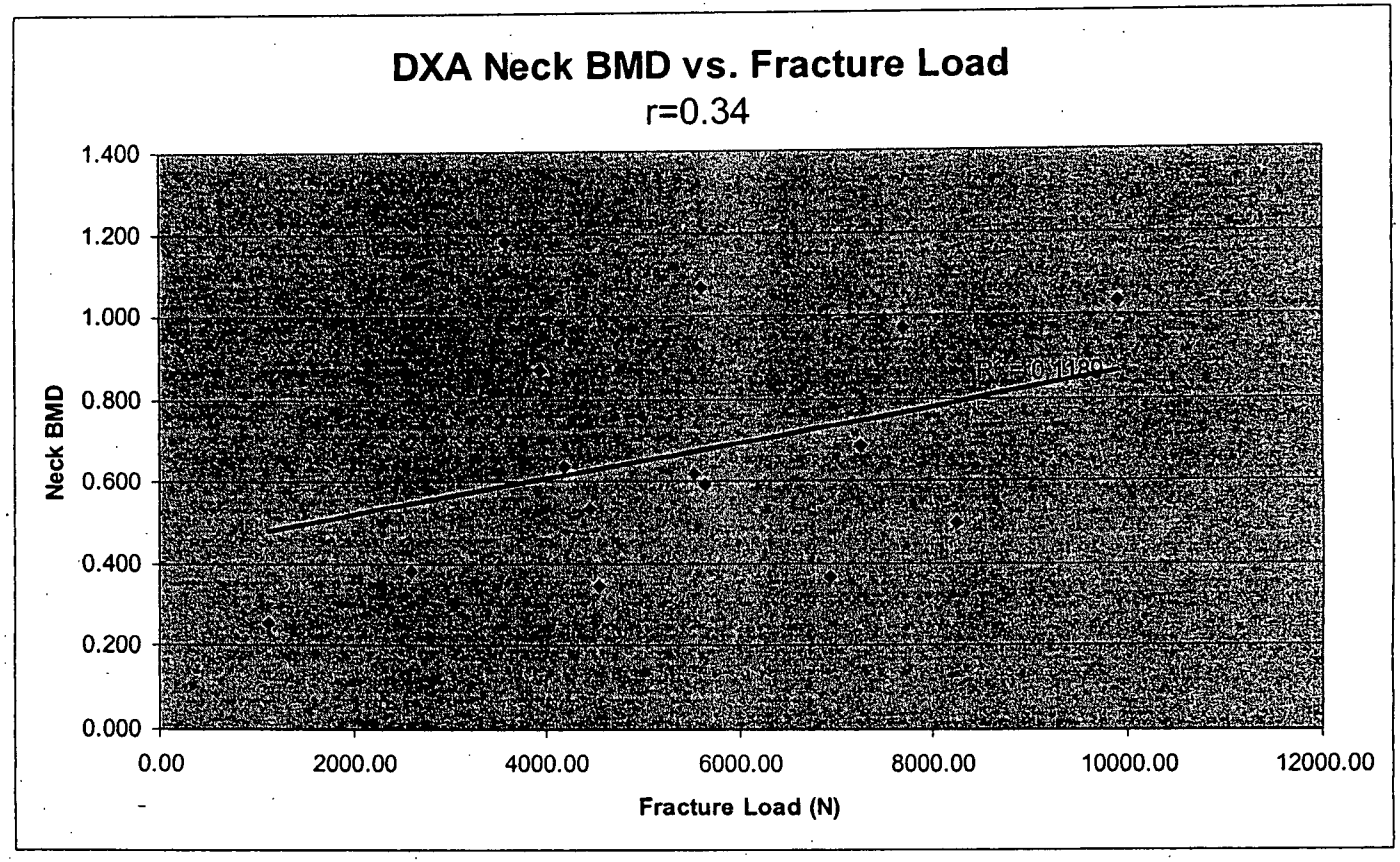


B



BEST AVAILABLE COPY

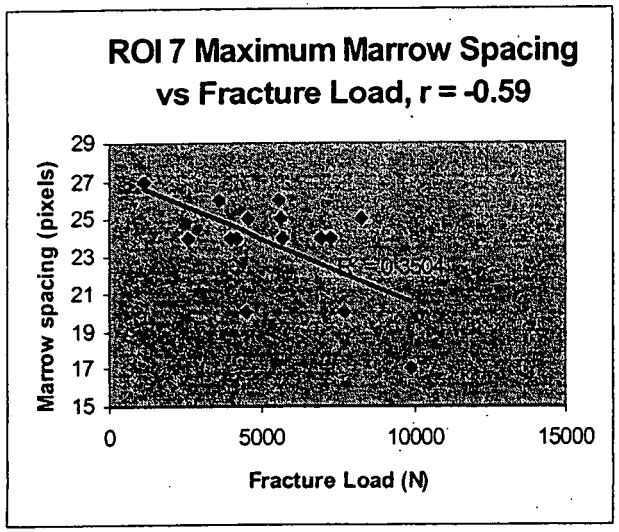
Figure 13: DXA Femoral Neck BMD vs. Biomechanical Fracture Load



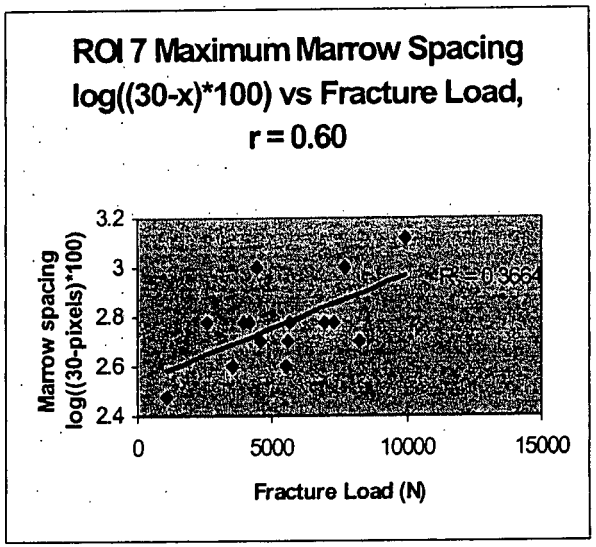
n=15, fresh cadaveric specimens

Figure 14: Bone Structure vs. Instron Biomechanical Fracture Load

A



B



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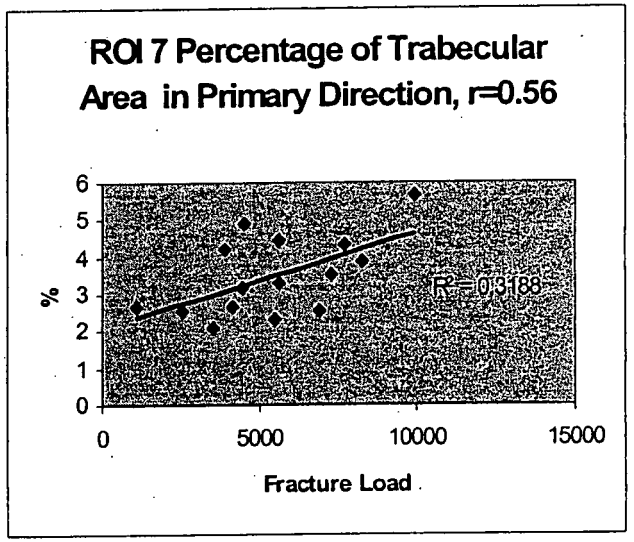
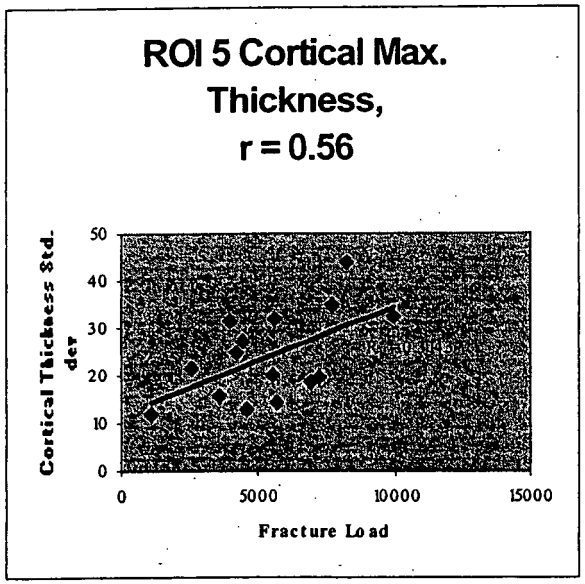


n=15, fresh cadaveric specimens

Figure 15: Macro-Anatomical Features vs. Instron Biomechanical Fracture Load

A



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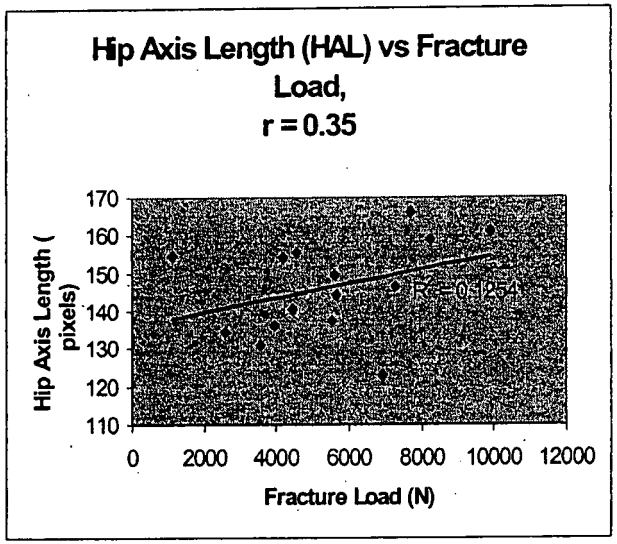

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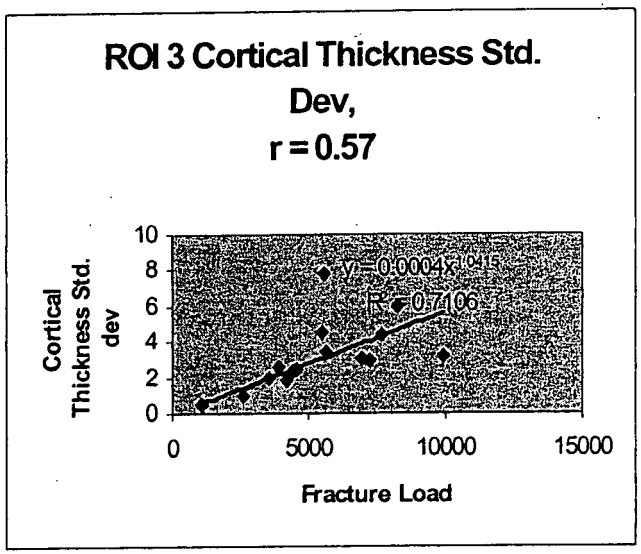
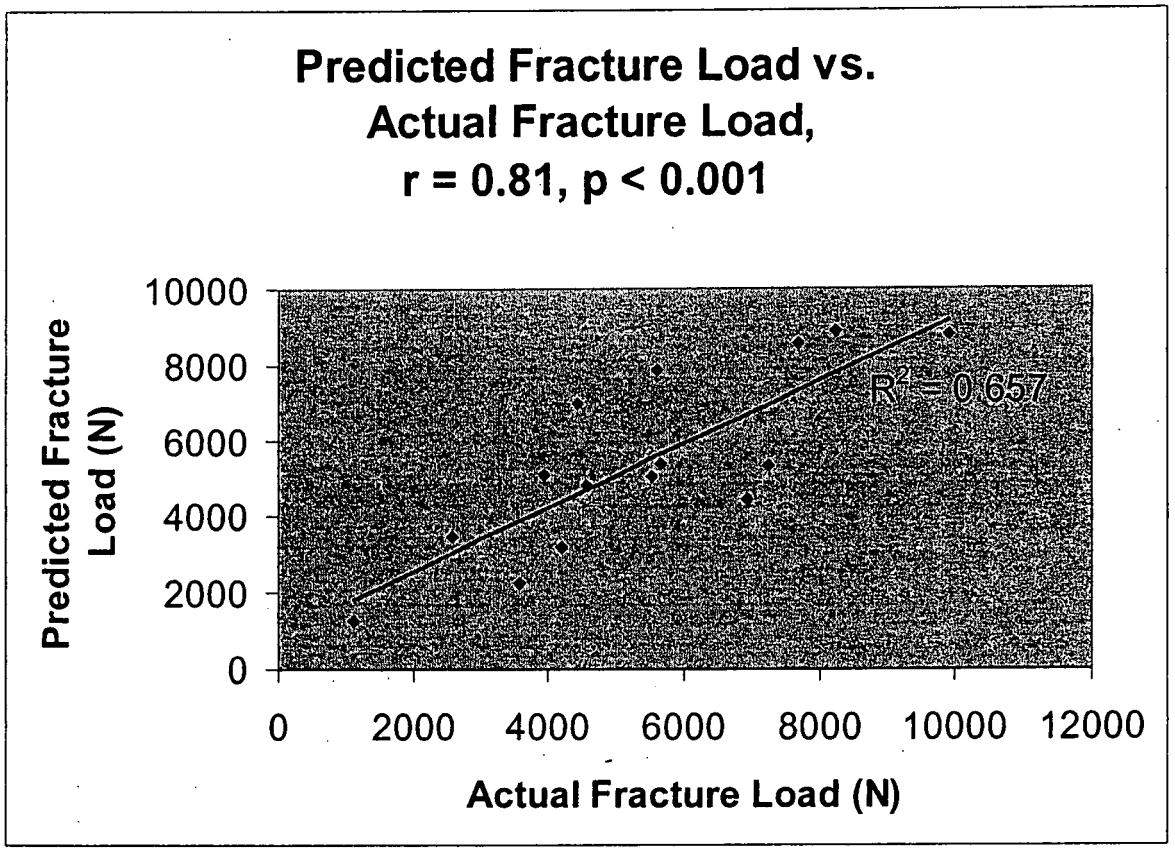


n=15, fresh cadaveric specimens

Figure 16: Multivariate Analysis: Combination of Bone Structural and Macro-Anatomical Features



n=15, fresh cadaveric specimens